JANUARY 31, 1946

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THE IRON AGE

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THIS WEEK IN THE

IRON AGE

Vol. 157, No. 5 January 31, 1946

Editorial

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Technical Articles

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Features

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News and Markets

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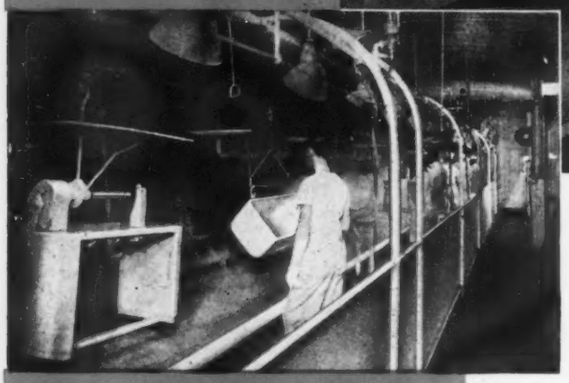
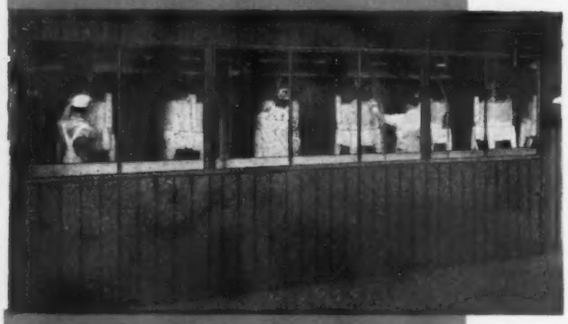
COMPLETE *Finishing* SYSTEMS

The famous Nineteen Hundred Washer receiving its first finish coat in Mahon Hydro-Filter Spray Booths.



Nineteen Hundred Irons moving through Mahon Hydro-Filter Spray Booths on the continuous conveyor production line.



Final Finish Coat is applied as products pass through Mahon Hydro-Filter Spray Booths installed in an enclosed Spray Room which is supplied with Heated Filtered Air.

. . . COMPLETE EQUIPMENT . . . from Preparation of Metal to Final Finish Coat

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Manufacturers of Complete Finishing Systems including: Metal Cleaning Machines • Rust Proofing Machines • Dry-off Ovens • Hydro-Filter Spray Booths • Drying and Baking Ovens • Filtered Air Supply Units • Hydro-Foam Dust Collectors • Paint Sludge Reclaiming Units, and Many Other Units of Special Production Equipment

MAHON

The
IRON AGE

ESTABLISHED 1855

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January 31, 1946

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Let's Release the Brakes

ONCE upon a time a number of people got together to build a marvelous machine that would turn out an enormous quantity of goods of every description with the least possible effort.

It was the greatest mechanism ever invented and put together and it should have produced enough to make everybody happy. But unfortunately, from time to time some part would break down or cease to function properly.

When this happened, everybody suffered. Lawyers and law-makers would be called in to devise and pass laws to make this machine work but that did not do much good, because the gears and pinions, shafts, pulleys and motors of the machine did not understand law. Nobody thought of calling in the engineers to fix it.

The machine age was built by engineers but is run by lawyers and politicians. Maybe that's why we are in the mess we are in today.

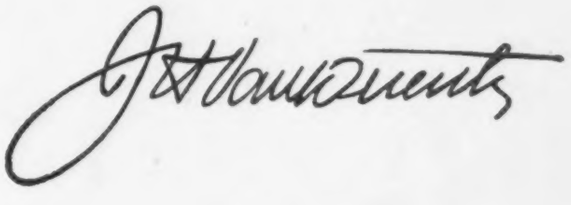
I was glad, therefore, to see some of our engineers and scientists step out recently and tell what they think should be done with the atom bomb. Nobody knows more about handling a tiger than the keeper who brought it up from a cub. Or better knows how dangerous it is to play with.

I hope that this is the start of an innovation, so to speak, whereby our engineers will emerge from their technical shells and play the important part that I know they can in putting our economic machine in order.

Engineers and production men know how the wealth and prosperity of a nation are built. The man in the street and the majority of workers in our plants have no conception of it.

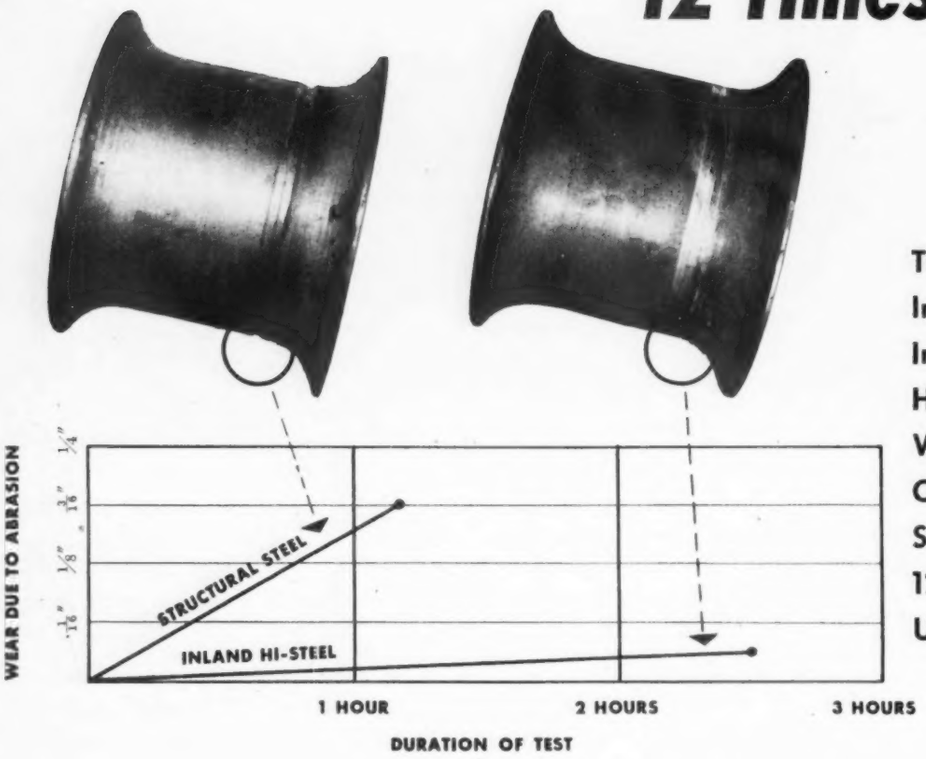
Engineers and production men and progressive management know that all wealth, however it may be distributed after it is created, must come from productivity. And that to increase public wealth, whether in the form of wages, profits or taxes, you must continually strive to increase productivity. And not merely total productivity which could be done by importing 50 million Chinamen, but productivity per hour and per capita.

The old notion was that public wealth came from the possession of an abundance of natural resources. But resources do not become wealth until produced. Take China, Russia or India for example. Each has a richer and greater supply of natural resources than has the United States but there is no comparison in national wealth because there is no comparison in the rate of productivity.



Resists Abrasion . . .

12 Times Longer!



Tests Show That Inland HI-STEEL,* In the Precipitation Hardened Condition, Will Outwear Ordinary Structural Steel More Than 12 Times When Used For Winch Heads

*TRADEMARK—REG. U. S. PAT. OFF.

Recent tests were undertaken by American Hoist & Derrick Co., St. Paul, Minn., to determine the comparative wearing qualities of winch heads—made of Hi-Steel in the precipitation hardened condition and of ordinary structural steel. To simulate actual field operation as closely as possible, the steel cable around the winch was held under load and the winch revolved. Both winch heads were of identical size and shape. In the first test of 70 minutes with ordinary structural steel, and in the second of 150 minutes with Hi-Steel (as indicated by the graph above), Hi-Steel's exceptionally higher resistance to abrasion was clearly demonstrated.

Along with superior resistance to wear, Hi-Steel also offers you a high strength steel—permitting considerable weight reduction while maintaining the required structural strength—as well as great resistance to fatigue, impact, and atmospheric corrosion. Since Inland Hi-Steel can be furnished in most structural sections, plates, strip and sheets, and is economical to use, its applications are many and varied.

A partial list of products in which Hi-Steel is successfully used: Bins, Boats, Bolts, Booms, Bridges, Buckets, Busses, Chutes, Construction equipment, Conveyors, Cranes, Cyclone stacks, Locks, Floor Plates, Hoists, Hoppers, Material handling equipment, Mine equipment, Ore cars, Railway cars, Screens, Stacks, Structural framework, Tanks, Trailers, Trucks and Ventilators.

Write for the Inland Hi-Steel Engineering Bulletin No. 11. Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill. *Sales Offices:* Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. *Principal Products:* Bars, Structurals, Plates, Sheets, Strip, Tin Plate, Floor Plate, Piling, Reinforcing Bars, Rails, Track Accessories.

INLAND HI-STEEL

The Iron Age
Jan. 29, 1946

NEWSFRONT

► Residual alloys in current scrap steel are varying to such an extent that mills are required to analyze the melt before additions of alloying agents, thereby creating difficulties in the use of and marketing of certain forms of alloying agents.

► A new product as yet in its experimental stages is a vitreous enamel-coated cast aluminum.

► Western scrap producers, consumers and dealers are now engaged in controversy before the Interstate Commerce Commission on the projected $12.32 per ton freight rate on plate and structural scrap between the Pacific Coast and Chicago. The battle revolves around disposal of about 300,000 tons of Pacific Coast shipyard scrap.

► Particularly effective for the determination of intermittent defects in billets, such as secondary pipe, shrinkage cavities and internal cracks, is the supersonic reflectoscope.

These instruments send supersonic signals through the billet, measuring the time interval before their return. If free of defects, reflections come from the opposite side of the billet. If not, the interval is shorter.

► Lapping and polishing time of round plugs, pins or rods can be reduced one third by use of a special machine consisting of two precision ground cast iron rollers revolving on self-alining and adjustable bearings. Both rollers rotate in the same direction at the same rpm and can be adjusted to accommodate work up to 6 in. diam.

► Variation in chromium content of alloy steels influences case hardness and depth, recent studies in nitriding suggest. Steel grades that respond favorably to nitriding with ammonia gas in order of reaction are SAE 4130, NE 8640, NE 8630, NE 9440, SAE 1095 and SAE 1020.

While structural grades will respond to the nitriding treatment, appreciably smaller increases of surface hardness to superficial depths do not appear to warrant the application of nitriding to these materials.

► If present plans are carried out, the $600 two-cylinder passenger car which Grantham Productions, Ltd., hopes to have in production in England in 15 weeks will also be assembled in India. The $600 price is to cover on-the-road costs, including purchase tax, road tax and insurance.

► Production in major automotive plants in Britain is being delayed for lack of minor components. Windshield wipers, locks, door handles, lamp glasses and radiator decorations are among the offending parts.

► Although the decision has been made by the British government to alter the basis of taxation for passenger cars from the hp to the cc basis, no date has been set for the changeover.

► The purchase tax on new cars is changing the mode of business of the dealers, as they pay the tax upon taking delivery at the factory. Worrying about the inevitable lifting of the tax, no dealers want to be caught with stocks upon which the 28 pct tax has been paid when it is lifted. Therefore, dealers are refusing to stock any cars at all.

► A 36-passenger airliner, the Airspeed Ambassador, employing twin gas turbine units to power a propeller and to furnish jet power, is being built in Britain and is expected to go into commercial service by autumn. It will be the first commercial prop-jet airplane.

► American factory labor works much harder than people in Britain, according to D. R. Nicholson, of Britain's Factory Manufacturers' Clothing Assn. after a trip to the U.S. The difference is attributed to the poor wartime British diet, with lack of vitamins reflected in little vitality and much illness.

Mr. Nicholson said there is enough food wasted in New York in one night to feed Britain for a week.

► Britain is readying its largest airliner, the Brabazon, for test flights. It has a wingspread of 115 ft, somewhat larger than the Lancaster bomber.

► Some 400 Liberty ships are under charter to the British, and the fear there is that Congress will soon either force a purchase or demand that they be handed back. The former would nick a big hole ($320 million) in the loan now under discussion, and the latter course would wreck Britain's current export drive.

FIG. 1—Using the supersonic reflectoscope for testing small billets in the laboratory.

. . . Supersonic Testing

USE of the supersonic reflectoscope,* discussed in this article, has proved to be a very effective method of inspecting steel billets for internal defects. The reflectoscope test, in general terms, consists of sending supersonic signals through the steel billet and measuring the time elapsed between sending the signals and receiving their reflections.

If the material is free from defects the reflections will come from the opposite side of the billet only. If the material contains internal defects, reflections will be received from the defects in shorter time than would be required for the reflection from the opposite side of the billet. The supersonic frequencies employed are from 1 megacycle (1 million cycles per second) to 5 megacycles. Other frequencies are made available by Sperry, but this range of frequencies is most suitable for the supersonic inspection of steel billets.

In determining the soundness of its products, the producer of quality steels has had at its disposal fracture tests and macroetch tests. The fracture test consists of fracturing a notched sample, either hot or cold, and examining the fracture surfaces obtained. Macroetch tests consist of cold-sawing billet slices which are deep-etched in a hot 50 pct solution of hydrochloric acid or other suitable acids. These methods of testing provide adequate and reliable information to the inspector in most instances.

* *Developed by Sperry Products Inc., Hoboken, N. J.*

In order to obtain suitable billet slices for macroetch, a piece 8 to 15 in. long is either torch cut or cold sawed in the mill and taken to the laboratory where suitable slices are cut and etched. The objectionable features of this practice are: (1) Loss of steel, especially on large billets where multiples may be destroyed in order to obtain the samples; (2) transportation and handling of the samples, and (3) the man hours required to saw the slices in the laboratory.

Procedures based on experience have been established so that samples for macroetch tests are taken from billet locations which represent positions in the original ingot where defects are likely to occur. Defects such as pipe, planes of weakness, excessive nonmetallic inclusions a well as many other characteristics, which may or may not be desirable in the product, are readily observed. However, certain defects which are intermittent in character, such as secondary pipe, shrinkage cavities, and internal cracks, commonly referred to as flakes or ruptures, are not necessarily associated with any particular locality in the original ingot and may not be included in the samples taken for macroetch. If they are included in one of several samples taken, the inspector must ask himself the question, "how much of this lot of material must be scrapped and how much of it is suitable for shipment to the customer?"

It is in the inspection for these intermittent defects that the reflectoscope has proved itself a valuable tool. The instrument does not provide a universal test and cannot entirely replace procedures designed to determine billet homogeneity. However, it is capable of locating those internal defects which possess internal reflecting surfaces whether they are intermittent or not.

The reflectoscope is portable, being mounted on a

FIG. 2—Testing for soundness in large billets with a reflectoscope.

in a Steel Plant . . .

Use of the Sperry supersonic reflectoscope in testing for internal soundness in billets and blooms up to 20-in. sq., is described in this article. Results in this, the first industrial application of this instrument, suggest that a new and valuable testing technique is now available to the steel industry, particularly for the locating of intermittent internal defects.

By J. V. RUSSELL and H. E. PELLETT
Metallurgists
Republic Steel Corp., Chicago

wheeled carriage which can be moved to any part of the plant. If necessary, the carriage may be detached in order to place the instrument in localities which would otherwise be inaccessible.

In addition to the advantage of more reliable inspection, the non-destructive characteristics of the reflectoscope test have resulted in the saving of a considerable amount of material and effort consumed in macroetch testing for intermittent defects.

The Sperry reflectoscope is a supersonic instrument in which a cathode-ray oscilloscope is used to indicate the reflections of supersonic wave trains within metallic bodies. The cathode-ray oscilloscope provides an electron beam which sweeps across the fluorescent screen of the cathode-ray tube. The beam is approximately normal to the screen and is directed by vertical and horizontal electrostatic fields within the tube so that a luminous spot travels across the screen every sixtieth of a second. Time of travel of the spot across the screen is adjustable from approximately 10 m sec to 2000 m sec.

The traverse of the spot appears to the observer as a line or sweep across the screen. A special circuit modifies the vertical field of the cathode-ray tube when the spot is beginning its sweep across the screen from left to right. The result of this modification is an initial pulse pattern at the left end of the sweep as in fig. 3 (top). This pulse is applied to the crystal 60 times per sec for a few microseconds. After the initial pulse has been sent into the material, no further voltage pulses are applied to the crystal and the crystal remains at rest in a position to serve as a receiver for vibrations reflected back from defects or the other side of the sample.

The reflected vibrations are imparted to the crystal so that it vibrates mechanically. These vibrations produce a small oscillating voltage which is amplified by the instrument and applied to the vertical field of the cathode ray tube. The modification of the vertical field by this voltage results in a modification of the path of the spot as it sweeps across the screen, and a reflection pattern is observed on the screen.

Since the spot is traveling across the screen for the entire time during which the crystal is serving first as a transmitter and then a receiver, the reflection pattern appears at some point to the right of the

initial pulse pattern. The distance along the sweep between the initial pulse pattern and the reflection pattern is a representation of the time required for the supersonic wave trains to travel from the surface of the sample to the reflecting surface and return.

The sweep of the spot across the screen is shown as a rectangular wave, with each cycle representing a definite time interval. Since the distance between the initial pulse and reflection pattern represents time for the sound waves to travel a given distance and return, the rectangular wave cycles, called inch marks, can be used to indicate increments of the distance.

The function of the instrument being to indicate reflection of sound waves from reflecting surfaces, it follows that reflecting surfaces of internal defects will produce reflection patterns on the sweep. A reflection pattern in sound material is produced only by reflection from the opposite side (backwall) of the sample. In unsound material, one or more reflection patterns are produced by reflection from the surfaces of internal defects. The defect reflection patterns appear on the sweep between the initial pulse pattern and the backwall reflection. The latter may be reduced in amplitude or blocked out entirely as a result of the sound waves being reflected by the defects.

Three sound wave frequencies are available for testing with the instrument at Chicago district plants of Republic Steel Corp. They are 1 megacycle, 2¼ megacycles and 5 megacycles. A separate crystal is provided for each frequency and the instrument must be retuned at each change of frequency.

The relationship of frequency employed to the sensitivity of the instrument has proved rather indefinite in our experience. The choice of frequency has been made by cut and try methods in choosing between 1 and 2¼ megacycle frequencies. The use of 5 megacycle frequency has been limited due to fact that transmission at that frequency has been more difficult than at the other two.

The first industrial application of the Sperry supersonic reflectoscope was initiated at the Chicago district of Republic Steel Corp. in January, 1945. Preliminary tests were conducted in cooperation with engineers from Sperry for a period of three months. During the three month period samples received in the laboratory for routine macroetch were explored with the reflectoscope prior to the cutting of slices for etching. In this manner, macroetch results were obtained for material which was indicated by the reflectoscope to be sound as well as for material which was indicated to be unsound. The dependability of the reflectoscope test results was definitely established by these laboratory tests.

The requirements and conditions necessary for effective testing were established as follows.

(1) An alternating current power source of 110-120 v, 50-60 cycles is required.

(2) The surface of the steel under test must be flat and smooth to ensure good contact with the searching unit of the instrument. Special searching units are available for curved surfaces. The prime requirements, with regard to the surface, is that intimate contact between the searching unit and the surface be attained.

(3) A light oil must be used to provide a thin oil film between the searching unit and the contact surface of the sample.

(4) The backwall surface of the sample should be fairly smooth and approximately parallel to the contact surface.

(5) The sample thickness must be greater than 1 in. in a direction perpendicular to the contact surface.

(6) A test block containing known localized defects is necessary for calibrating the instrument and for reproducing tuning and sensitivity from day to day.

In the latter part of the three month period the instrument was moved to the mill where tests were conducted on large billets and blooms in sizes up to 20 in. sq. One of the first problems encountered in the mill was the attainment of surfaces on the billets which would provide proper crystal contact and yet not involve long periods of grinding.

The transmission of sound waves from the crystal through the surface of the sample is dependent upon good contact of the crystal with the surface. Faulty contact results in distortion of the pulse and unsatis-

TABLE I

Types of Surfaces Investigated

Surface Types	Remarks
1. Smooth, flat steel surface obtained with a stationary surface grinding machine.	Excellent surface provided good contact between crystal and sample but could be obtained only in the laboratory.
2. Ground surface with patches of tightly adhering scale. Obtainable when sample with both loose and tight scale patches was ground with a portable disc grinder.	Unsatisfactory except in areas of either steel, or with scale large enough to accommodate the area of the crystal face.
3. Ground surface with tight scale adhering to entire surface.	Most desirable surface for routine tests. Easy to prepare with a portable grinder. Good crystal contact.
4. Steel surface from which tightly adhering scale had been removed.	Unsatisfactory. The surface below a layer of tightly adhering scale was usually wavy. Peening off the scale added to unsatisfactory characteristics.
5. Curved surfaces adjacent to sheared billet ends, etc.	Reflection pattern not obtainable since opposite side was not parallel.
6. Rough machined or sawed surface.	Unsatisfactory. Must be ground smooth and flat.

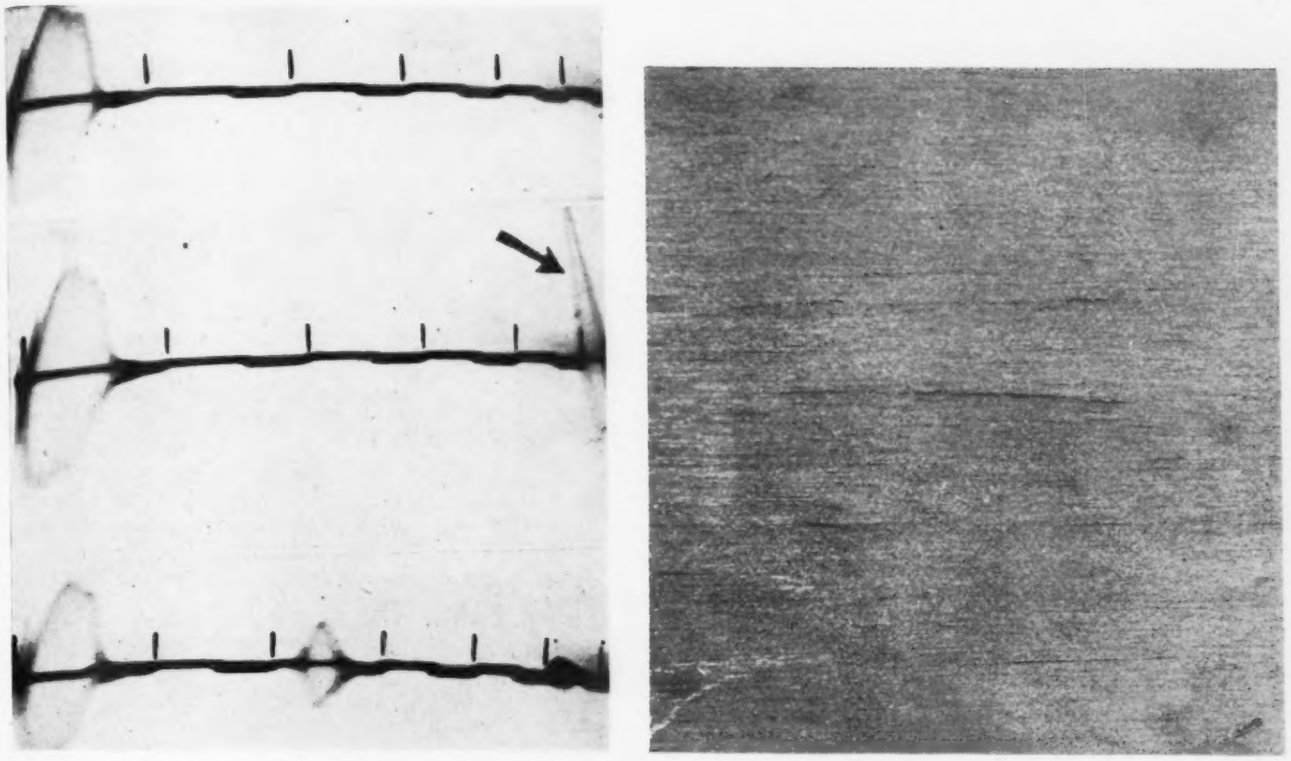


FIG. 3—Pulse patterns, showing the initial pattern at the left (top view) and the sweep from left to right. Center pattern shows the initial pulse and the backwall pattern (arrow) of a sound section of a 6 in. billet. Bottom pattern indicates a defect at about the center of the screen. Distance from center of billet is indicated by vertical lines added to photograph. Etched cross-section of the billet (right) at the point of the defect indicated a rolled out flake.

factory transmission and reflection from the opposite side.

Surface preparation in the laboratory had not been a problem since suitable stationary grinding equipment was available. However, in the mill the question became, "how little surface preparation may we do and still make reliable tests?" Surface preparation in the mill involved rather large surface areas and it was highly desirable to prepare those surfaces with a minimum amount of grinding. With the aim of producing the most economical and satisfactory surface, several types of surfaces were tried. Results of this surface investigation are tabulated in table 1.

Tightly adhering surface scale was a distinct asset in the preparation of sample surfaces. A satisfactory surface could be prepared very quickly under these conditions with a portable disk grinder. However, in areas where the scale had been removed by handling, more grinding was required.

The results of tests conducted in the mill were also followed with macroetch tests. Although the macroetch results verified the reflectoscope findings, new factors were encountered in connection with the large blooms which affected the interpretation of the results. These factors are discussed later in this paper.

With the experience gained from the preliminary tests as a basis, routine reflectoscope testing procedures have been established. Due to the lay-out at the Chicago plant it is necessary to conduct the routine reflectoscope tests for small billets in the laboratory

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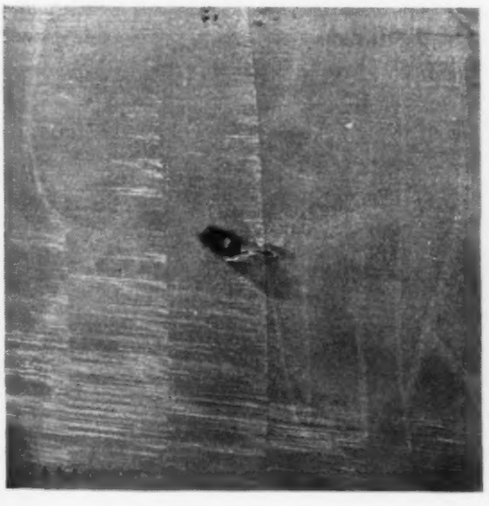
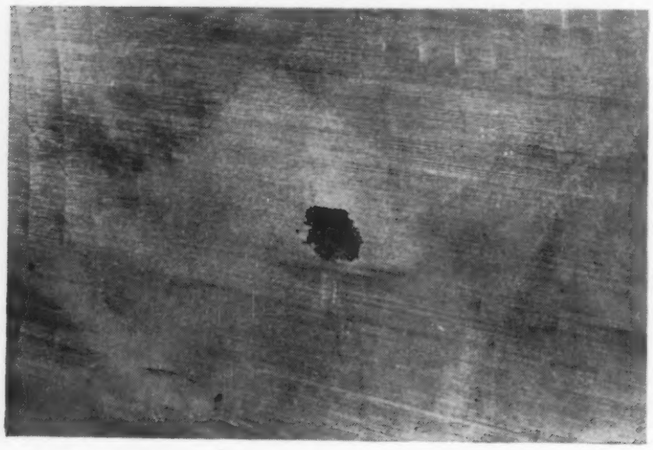


FIG. 4—Pattern from a 4½ in. sq billet containing a small internal hole (arrow). Peak following the defect is the first backwall reflection. Etched cross-section (left) shows the defect picked up by the reflectoscope.

and tests for the large billets and blooms in the mill where they are produced. The ideal arrangement would call for all testing to be done in the mill and thus eliminate the cutting of laboratory samples except in instances where supplemental etch tests are indicated. Since billets in the smaller size ranges are products common to two mills widely separated within the plant, it has been found that the testing of products from these mills is expedited more efficiently in the laboratory. Tests in the laboratory and in the mill are made after the material has been removed from the controlled cooling pits or cooling furnaces and prior to pickling and chipping.

Use of the reflectoscope for routine laboratory tests on small billets is shown in fig. 1. The samples are on a conveyor and have a side ground smooth by a grinder utilizing replaceable abrasive disks mounted on a flexible rubber wheel. Fig. 2 illustrates reflectoscope testing technique on large billets in the mill. The smaller billet section at the operator's right in this photograph is a test block containing known localized defects and is used for calibration in setting up the instrument.



In routine testing, transmission of the supersonic signal is usually applied in a direction normal to the direction of rolling. Although it is possible to transmit parallel to the rolling direction, greater accuracy in locating individual defects is attained by transmitting through the short dimension of the billet or bloom. A helper, assigned to the reflectoscope operator for the purpose of preparing the surfaces and trained in the responsibility of selecting the surface most adaptable to quick preparation, selects the billet or bloom surface to be used and prepares a ground surface approximately 2 ft long and 6 inches wide at each end and at the middle of the billet. Since the defects sought are usually found along the central zone of the billet, the 6 inches wide strip of prepared surface is in most instances sufficient. Billet samples in the laboratory are prepared by grinding the entire surface along one side of the sample.

Since it is desired to locate internal defects with the reflectoscope, the operator must be familiar with the types of defects likely to occur in the material and which will cause reflection patterns. Further, he must regard the defect reflection patterns in terms of the details of previous steps in processing of the material. When the occasion demands it, he must supplement his reflectoscope test results with macroetch tests.

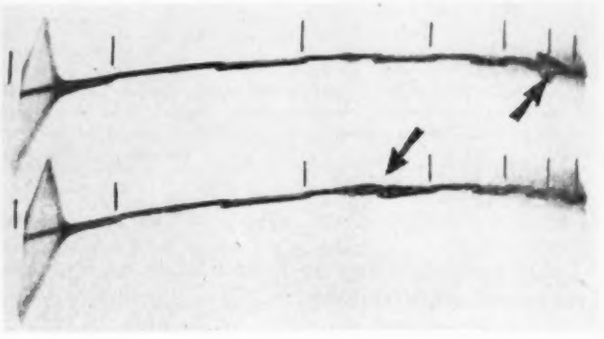
In considering the defect reflection patterns the following principles are important:

(1) The supersonic signals are transmitted in a direction normal to the crystal face in a beam with a cross-sectional area, at the point of transmission, equal to that of the crystal face. There is some divergence of the beam but we have not had reason to consider divergence in our testing.

(2) The size of amplitude of the defect reflection pattern is a function of the angle at which the beam strikes the reflecting surface of the defect, the projected area of the defect, the frequency employed, and of the reflecting characteristics of the defect. That is, a defect which is normal to the beam produces a reflection pattern of greater amplitude and sharpness than the same defect would produce if it were situated at a 30° angle to the beam.

(3) Curved or irregular reflecting surfaces, such as found in shrinkage cavities or secondary pipe, produce relatively small reflection patterns. Flat reflecting surfaces, such as found in the case of flakes, produce sharp, definite patterns if the flakes are normal to the beam or small rounded patterns if they lie at a small angle to the beam. The orientation of flakes is usually random in the central zone of the billet and enough of them are normal to the beam so that definite defect reflections can be obtained.

FIG. 5—Initial pulse, sweep and backwall pattern for a 16 in. sq bloom is shown on top. Bottom pattern indicates a defect (arrow) later found to be the shrinkage cavity shown in the sectioned billet (left). Arrow in upper pattern points to backwall reflection.



Figs. 3 to 5 show some of the typical reflection patterns of the Sperry reflectoscope, together with some typical defects causing a deviation in the normal pattern. Fig. 3 (top) shows the initial pulse pattern at the left. The sweep of the beam across the oscilloscope is from left to right and is shown as a rectangular wave. Each cycle represents a definite time interval. The distance in inches from the billet surface is marked by vertical lines added to the photographs. The middle pattern shows the initial pulse, sweep and backwall pattern (arrow) of a sound portion of a 6 in. sq. billet. Note that the first and last inch marks are obscured by the pulse and backwall patterns. The bottom pattern reveals a defect at about the center of the screen. This was a flake, in a position approximately normal to the sound wave beam, such as is shown in the etched specimen (hot, 50 pct HCl). Note the diminished amplitude of the backwall reflection.

Fig. 4 is the pattern obtained from a 4½ in. sq. billet containing a small internal hole caused by rolling a ruptured billet. The reflection due to the defect is shown by the arrow. The peaks following the first

backwall reflection are higher order reflections from the billet surfaces and the defect. For most purposes they may be disregarded. The defect indicated by this reflection was found to be the small hole shown in the etched section. Subsequent investigation proved this hole to be a rolled out flake. The etch was hot 50 pct HCl.

Fig. 5 (top) is a photograph of the initial pulse, sweep and backwall reflection for a 16 in. sq. bloom. The bottom pattern indicates a defect (arrow) near the center of the bloom. Note that the backwall reflection is no longer evident. This defect was found to be a large shrinkage cavity shown in the cross section view.

Results of the reflectoscope tests for the various types of defects encountered were as follows: *Flakes*—Defect reflection patterns ranged from sharp and definite to small indefinite patterns. *Pipe, secondary pipe and shrinkage cavities*—Defect reflection patterns usually round and bulbous. *Center segregation*—Small, indefinite patterns when obtainable. Backwall reflection pattern usually lost over the center of the billet. This condition is more easily detected by macroetching.

Scattered segregation—Poor transmission characteristics. Backwall reflection very small or absent entirely.

Variables—Inherent in steel billets and blooms and are apt to affect the transmission of the sound wave beam. However, these variables are more likely to be encountered in large blooms than in the smaller billets. The variables and their effects are as follows:

(A) Large as-rolled grain size may interfere with transmission, i.e., no backwall pattern is obtained.

(B) Scattered segregation may permit only partial transmission or entirely prevent the attainment of a backwall pattern.

(C) Clusters of small shrinkage pinholes prevent through-transmission and in most cases do not provide defect reflection patterns. Absence of defect reflection patterns is due to the uneven surfaces of the voids. Instead of the sound waves being reflected back to the crystal with sufficient intensity to cause a reflection pattern, they are dispersed in all directions.

It can be concluded from these results that the reflectoscope indicates positively the presence of internal reflecting surfaces. As previously stated, the instrument does not provide a universal test, but where satisfactory transmission of the sound wave beam is obtained, internal reflecting surfaces of defects are discovered. The value of the test is realized from the knowledge that rejectable material is diverted from shipment to the customer, and it is no longer necessary to make the choice of either rejecting an entire lot of steel or resorting to destructive retesting to determine that part of the lot which is sound.

Further work is being done at the Chicago District to expand the use of the reflectoscope in both research and in testing procedures. Similar instruments are now in use in other districts of Republic Steel Corp. The instrument is new and the possibilities for its use in the steel industry will not be exhausted for some time to come.

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Roller Lapping Machine

LAPPING and polishing of round plugs, pins, or rods, heretofore a slow and tedious job, has been simplified and speeded up by the introduction of a roller lapping machine. Produced by Spitfire Tools Inc., this machine is claimed to reduce lapping time to approximately one-third.

The machine consists of two precision ground cast iron rollers revolving in self-alining and adjustable bearings, one being approximately 3 in. in diam by 12 in. long, and the other approximately 6 in. diam by 12 in. long. Both rollers rotate in the same direction at the same rpm, and can be adjusted to accommodate work up to 6 in. in diam.

In using the Spitfire roller lapping machine the usual procedure is to grind the workpiece to within 0.0002 to 0.0004 in. of the required diam, and then lap to size. Abrasive compound is spread evenly over the rollers, the work placed between them, and then a notched fiber stick is pressed down on it and moved slowly and evenly from side to side. If it is necessary to lap a small amount off any particular section, the fiber stick is merely kept longer on that section.

Friction of the rollers on the plug causes it to revolve and the difference in the surface speed of the rollers brings about a lapping or polishing action. Tapered plugs or plugs with shoulders are handled with equal ease. Waves and high spots are removed from the length of the plug or rod due to the line contact of the work and the rollers. Since excessive heat is dissipated to a great extent by the large mass of the rollers, a "cooling period" is ordinarily not necessary before measuring.

Nitriding of Aircraft Steels

INCREASED demand for surface hardening of finished steel parts is demanding more complete and accurate data on nitriding of aircraft steels, other than nitriding grades, which develop abrasion-resistant surfaces by virtue of forming stable nitrides of principally chromium and aluminum when these elements are present in substantial quantities. Unfortunately, the desirable features of nitriding have made this process of such popular usage that considerable misapplication has been encountered.

Numerous instances are on record of wartime emergencies giving rise to indiscriminate nitriding specifications to surface harden several standardized grades of structural steels without adequate data to justify such specification to design limits of hardness and tensile strength. This has resulted in many parts rejected because of insufficient case hardness or depth or unsuitable core properties.

This investigation is an effort to clarify conflicting data relating to the actual properties obtainable when the nitriding process is applied to several types of structural aircraft steels which are not specifically known as nitriding grades.

Equipment assembled in the Lockheed research laboratories for experimental nitriding under carefully controlled conditions was essentially similar in design to general industrial installations. This equipment consisted of a sealed, stainless steel container provided with thermocouple protection tube and flexible inlet and outlet, permitting easy insertion and removal of the box from a circulating air-draw electric furnace used as a heating chamber.

Control of ammonia gas flow to the nitriding chamber was effected by suitable use of pressure valves, flowmeters and a mercury column manometer when very low inlet pressures were necessary for proper processing.

Temperatures at the point of work in the nitriding chamber were measured by potentiometer and thermocouple, while actual furnace temperatures, not materially affected by passage of cooler gases, were of necessity maintained at slightly higher levels by Micromax control in order to attain desired work temperatures. Micromax control permitted regulation of temperature to ±5° F in the range of 900° to 1100° F.

A standard type pipette was employed to measure the dissociation of ammonia gas at the exhaust side of the nitriding chamber. Inlet and outlet tubes extending well into the nitriding chamber were arranged to insure uniform flow and distribution of gas over the surfaces of steel specimens. The specimens were mounted on inconel wire racks during exposure to anhydrous ammonia gas previously passed through a silica gel drying tower.

Specimens for experimental nitriding were ⅜-in. thick wafers cut from previously heat treated ½-in. diam round bars of selected steels, analyses for which are given in table 1.

Round bars of each type, ½ in. diam, 12 to 15 in. in length, were heat treated by quenching from recommended temperatures in suitable media, either oil or water. Test wafers cut from these bars were surface ground on parallel flat sides to approximately a No. 40 grind finish.

Since all samples were nitrided in the as-quenched condition, the time at nitriding temperature established the final hardness of core material. Problems of warpage and dimensional change were not considered

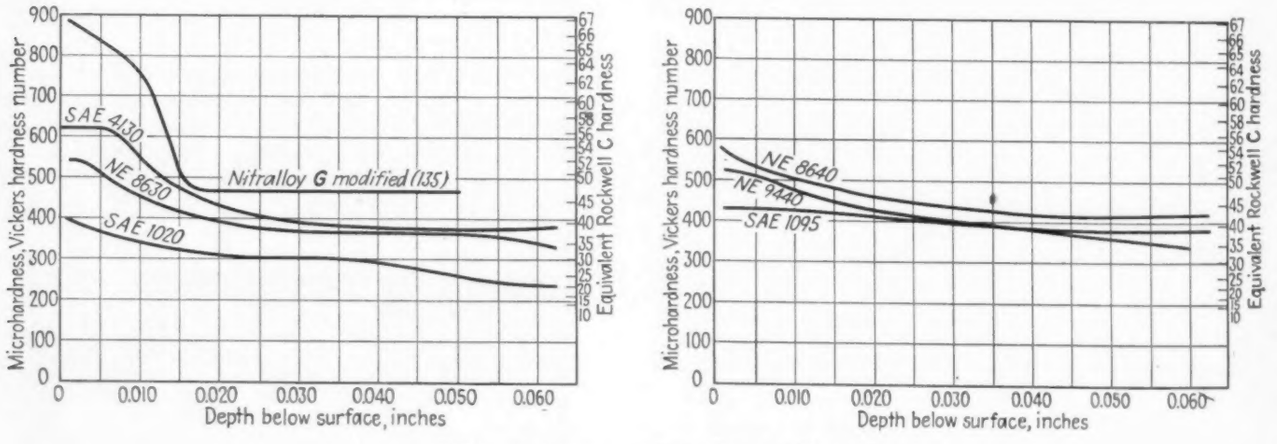

FIG. 1—Optimum properties after nitriding.

	Nitriding Time, Hr	Nitriding Temp., °F	Dissociation, Pct
SAE 4130	144	900	30
NE 8630	144	900	30
SAE 1020	144	900	30
Nitralloy G modified	144	950	30

	Nitriding Time, Hr	Nitriding Temp., °F	Dissociation, Pct
NE 8640	144	950	30
NE 9440	144	950	30
SAE 1095	144	900	30

Depth hardness data covering several aircraft steels not commonly considered nitriding grades, nitrided under varying conditions of temperature, time and ammonia dissociation are discussed in this article, together with case hardness and penetration characteristics which may be expected from optimum processing conditions.

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critical in this study and consequently this procedure was adopted to obtain maximum theoretical core hardness for a given nitriding treatment.

Specimens of all steels were nitrided at the temperatures, rates of dissociation and periods of time as follows:

Temperature, °F	900, 950, 1000, 1100
Dissociation, pct	30, 45, 60
Nitriding time, hr	48, 96, 144

Due to limitations of apparatus, size of nitriding chamber and test specimens, dissociations of 15 pct and 30 pct at 1100° F, as well as 60 pct at 900° F, were not obtained. In many instances it was found necessary to add steel shavings to the container to control successfully the rates of dissociation, which are normally controlled by flow of NH_3 gas only. These shavings increased the rates of dissociation by offering additional exposed surfaces for nitriding, permitting more accurate control of dissociation at higher rates of flow.

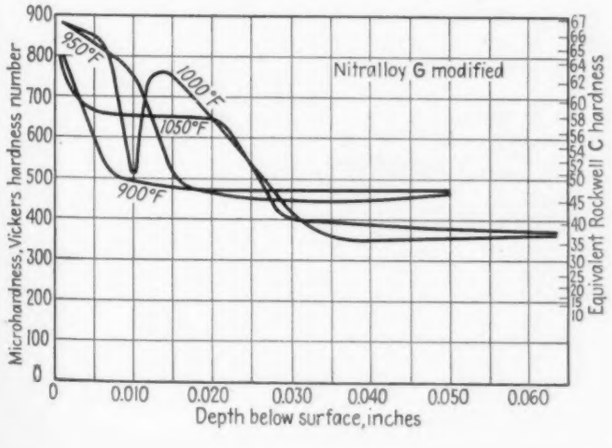
In the method used to evaluate the effects of the various nitriding procedures, test specimens were cross-sectioned, prepared, polished and etched in a manner suitable for the complete removal of disturbed metal at surfaces to be examined.

Table I

Analyses of Steels Investigated

	C	Mn	Si	Cr	Ni	Mo	Al
SAE 1020	0.19	0.80	.....	.....	.....	.....	.....
SAE 1095	0.95	0.35	0.19	.....	.....	.....	.....
SAE 4130	0.31	0.46	0.25	0.91	.....	0.22	.....
NE 8630	0.32	0.75	0.21	0.51	0.48	0.20	.....
NE 8640	0.40	0.75	0.20	0.59	0.62	0.23	.....
NE 9440	0.41	1.05	0.49	0.36	0.43	0.12	.....
Nitralloy G Modified (135)	0.43	0.60	0.19	1.33	.....	0.33	1.30

FIG. 2—Variation of nitriding characteristics with temperature. All steels nitrided 144 hr with 30 pct dissociation.

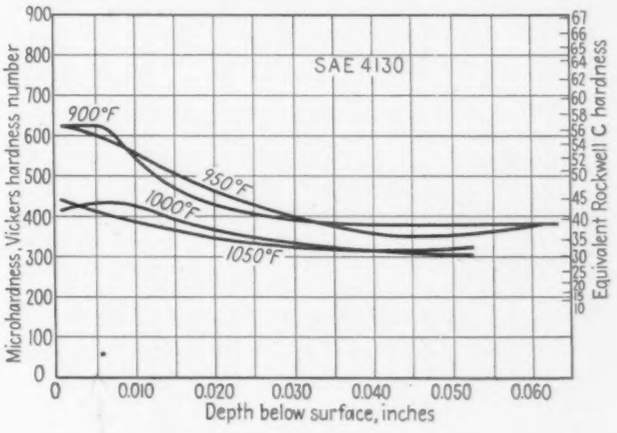


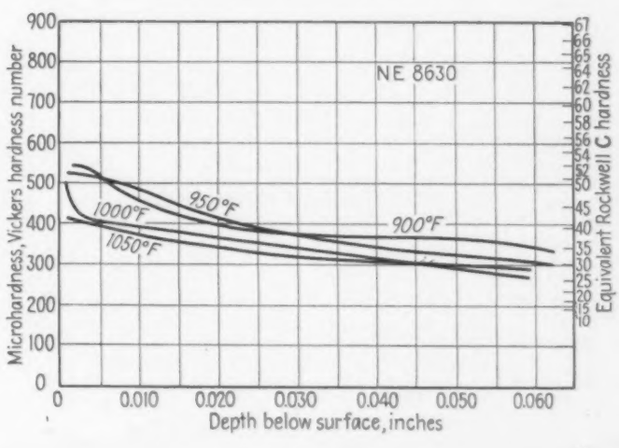
Depth-hardness curves were plotted from values of microhardness traverse data. Microhardness impressions were made across each section at intervals of 0.001 in. from the outer nitrided surface, the surface originally finish ground.

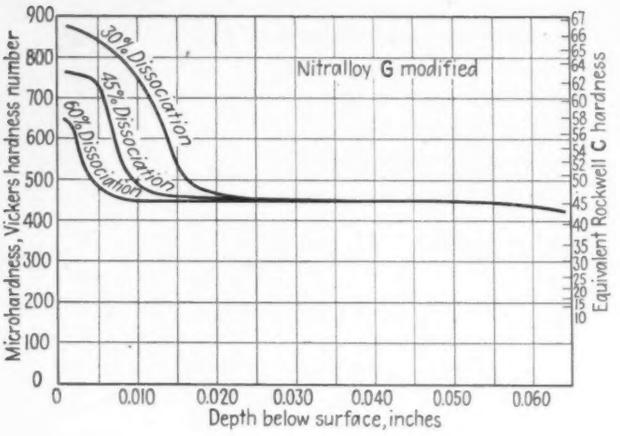
The instrument employed in the microhardness testing was a Vickers microhardness diamond pyramid, 136° indenter (Louis Schopper design), with the load constant at 0.0275 kg. Impressions produced by this instrument were measured microscopically, using a 10 magnification calibrated eyepiece (Filar). Lengths of pyramidal diagonals were converted directly to terms of Vickers hardness numbers which are shown adjacent to each plot of depth hardness curves in the accompanying graphs.

Calibration of the microhardness tester for readings in the ranges encountered in this study necessarily included application of a factor to compensate for elastic recovery of indentations between the time of actual impression and the time of measurement.

It is of interest to note that this correction factor becomes of increasing significance at high hardness levels, as the appreciably smaller size of impressions made by the constant indenter load are subject to greater error. Corrections applied to compensate for







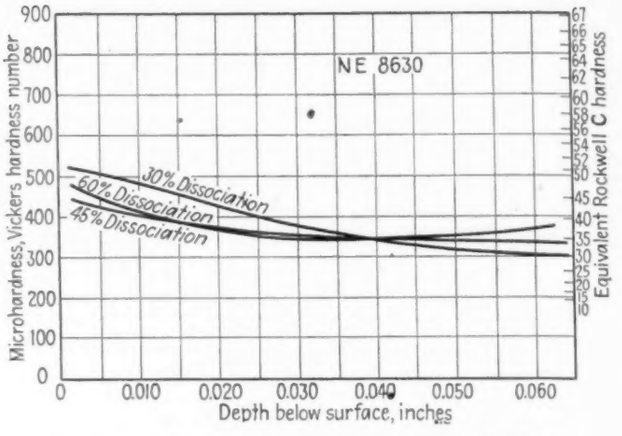
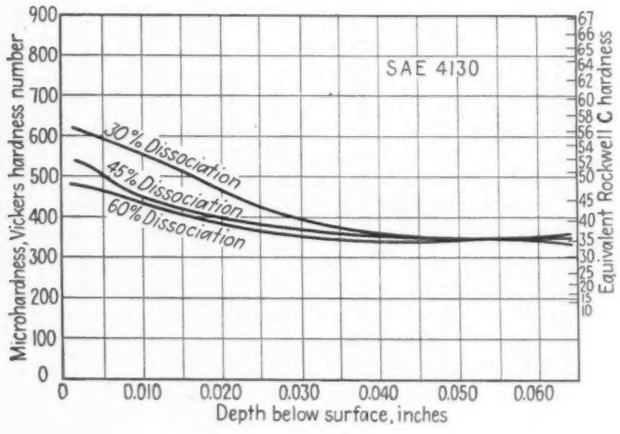


FIG. 3—Variation of nitriding characteristics with dissociation. All test pieces treated 144 hr at 950°F.



elastic recovery were established by correlation of standard 10 and 30-kg Vickers hardness with microhardness at levels in the range of Vickers hardness number 350 to 1200, equivalent Rc 36 to 72.

Depth-Hardness Plots

Variations of surface-to-core hardness, shown by microhardness traverse and clearly evident in the curves, are valid indications of properties produced by various nitriding treatments. These depth-hardness plots may be classified in essentially four separate groups. Fig. 1 illustrates optimum properties after nitriding these steels. Fig. 2 shows the variation of nitriding characteristics with temperature, while fig. 3 gives the variation of nitriding characteristics with dissociation. Figs. 4 to 6 illustrate the variation of nitriding characteristics with time.

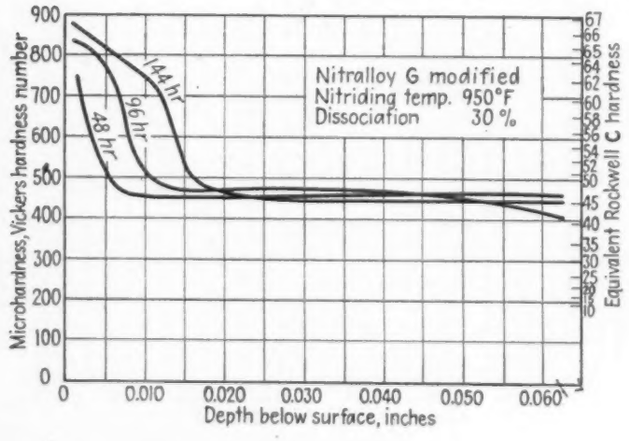
In further consideration of depth hardness plots, figs. 1 to 6, it becomes evident that discrepancies exist in the curves for nitralloy G Modified nitrided at 1000° F. The hardness traverse curve for this specimen, shown in fig. 2, indicates that a softer layer exists approximately 0.007 to 0.012 in. below the surface of the part. This softer layer was present in all specimens of nitralloy treated at 1000°F, thus its formation cannot be ascribed to discrepancies in nitriding procedures, but rather to particular structural modifications occurring in iron-nitrogen compounds at the 1000° F temperature level.

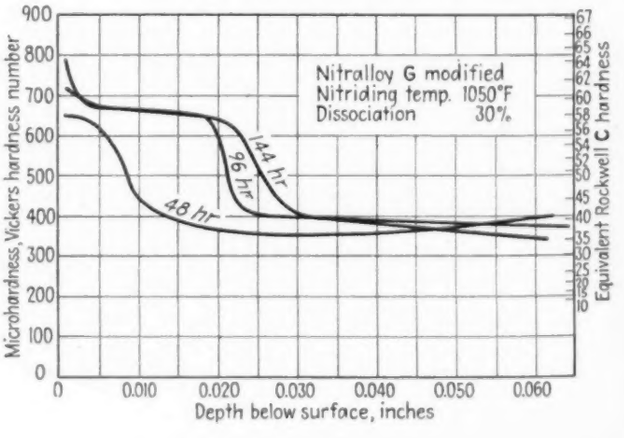
It is indicated, by reference to the iron-nitrogen system equilibrium diagram, that the dark-etching, soft layers are quite probably an eutectoid of Fe_4N and alpha solid solution. Figs. 7 and 8 illustrate the normal structure of nitralloy nitrided at 950°F and the structure containing the softer layer present in nitralloy specimens nitrided at 1000°F.

Extreme hardness variations across the specimen in fig. 8 are evident from the size of microhardness indentations shown as a traverse at intervals of 0.001 in. In all results charted, microindenter with 0.0275-kg load, 136° diamond pyramid, was used.

With factors of hardness considered as criteria in evaluating the effects of various nitriding processes, the correlation of the usual hardness scales used in connection with testing and acceptance of nitrided

FIG. 4—Variation with time of nitriding characteristics of nitralloy G modified.





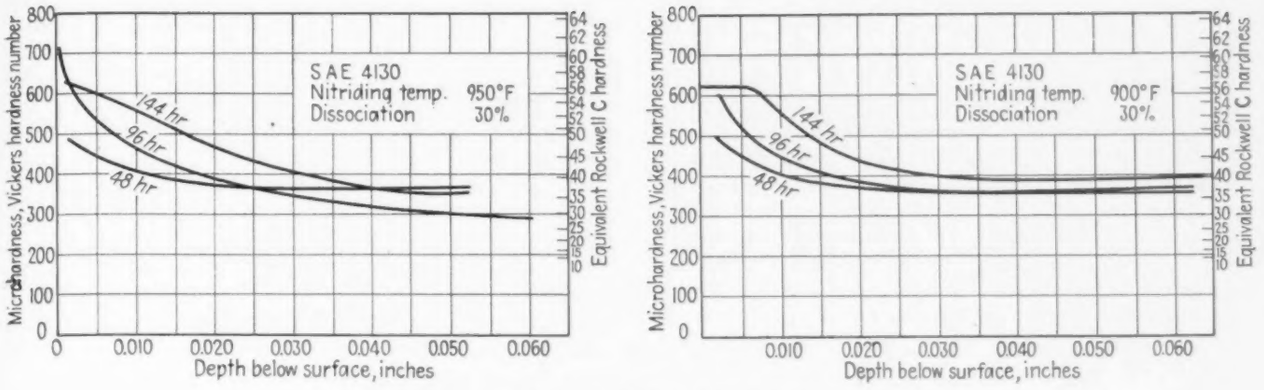


FIG. 5—Variation with time of nitriding characteristics of SAE 4130.

parts merits clarification. Numerous hardness tests made at the surface of nitrided specimens indicate that fair agreement exists between values as shown by Rockwell 15-N, 30-N, 45-N, superficial scales. The average discrepancy between these scales, over the full range of hardness for specimens of seven structural grades tested, was found to be 2.75 points equivalent Rockwell C.

At the particular hardness levels encountered in this study, the depth of Rockwell indenter penetration is of the order 0.001 in., 0.0015 in., 0.002 in., respectively, for 15-N, 30-N and 45-N scales. This is in agreement with findings pointing to slightly greater discrepancies in superficial hardness readings in specimens showing rapid falling-off of case hardness in sectional microhardness tests. Further, the correlation of superficial Rockwell scales indicates that the strength of core material may have a pronounced effect on the accuracy of such correlations, in that the presence of relatively brittle surface layers may give rise to cracking under concentrated hardness penetrator loads.

In the comparison of sectional microhardness with superficial hardness, the maximum superficial hardness is recorded at points consistently lower than those shown by microhardness. For the 63 specimens of the seven steels tested, it was found that an average deviation of four points equivalent Rockwell C existed.

It is believed that these relatively constant discrepancies may be due, in part, to surface effects not measured by sectional microhardness, such as decarburization to depths less than 0.0005 in. and/or the presence of more than one microstructural phase. However, wider variations again noted in specimens of extremely thin case point to support by core material as being of primary importance.

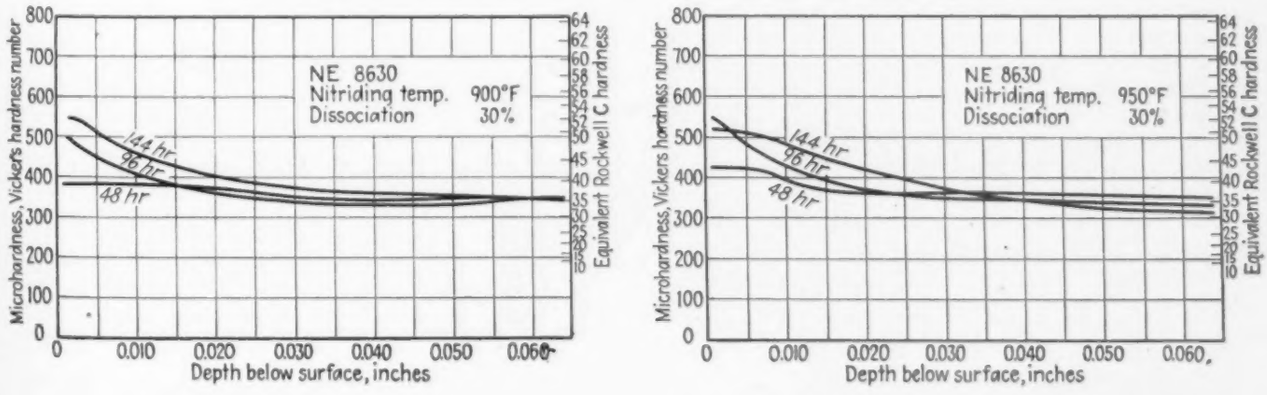
Microhardness Correlation

The correlation of microhardness with Rockwell C in the testing of core material again indicates consistently lower Rockwell C values of approximately 3.9 points equivalent Rockwell C below Vickers hardness numbers as shown by microhardness. Although this correlation is believed acceptable and within reasonable limits of normally anticipated error, this study has suggested that the development of more satisfactory correction factors may be advisable.

The principal conclusions drawn from the results obtained in this investigation serve to emphasize the marked superiority of nitralloy in response to nitriding to produce effective case hardness and depth, as compared to the several structural steels studied. Hardness values in excess of 625 Vickers (56Rc) are not reported in this study for other steels. This is in partial agreement with findings of other investigators.

In order of "favorable" response to nitriding with ammonia gas, the steels investigated gave the following sequence: SAE 4130, NE 8640, NE 8630, NE 9440, SAE 1095, SAE 1020. It is suggested that wide differences in maximum case-hardness and depth may be ascribed primarily to variations in chromium content of the several alloys. The desirable high hardness of nitrided surfaces extends to a relatively shallow

FIG. 6—Variation with time of nitriding characteristics of NE 8630.



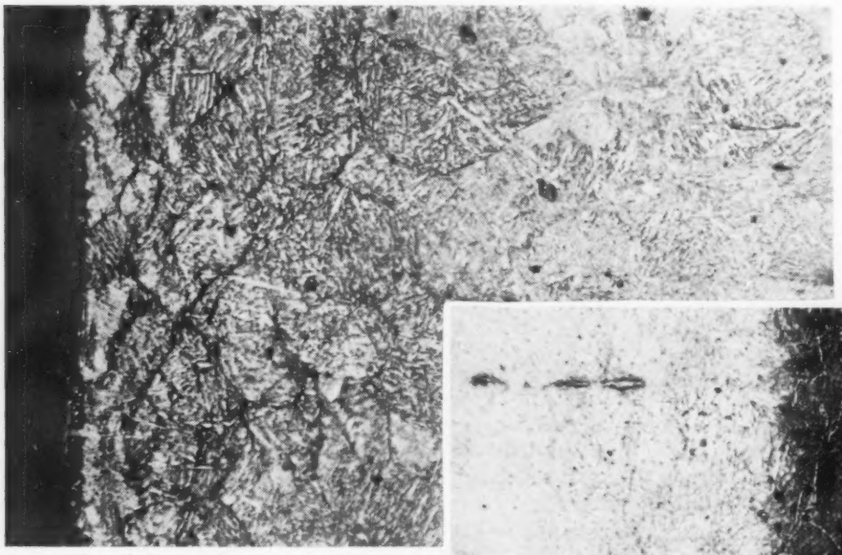
depth and difficulties encountered in preserving a satisfactory case during production may readily be appreciated.

While structural grades in general will respond to the nitriding treatment, appreciably smaller increases of surface hardness to superficial depths do not appear to warrant the application of the nitriding process to these materials, except in special instances where other methods of case hardening are not possible, or where the desirable features may overbalance the inferiority of obtainable case and core properties.

It is indicated that suitable correlations exist between Rockwell hardness scales and adequately corrected microhardness values and that the method employed in evaluating nitriding effects by sectional microhardness traverse is entirely satisfactory. Although fair agreement exists between maximum case hardness values as recorded on Rockwell 15-N, 30-N, and 45-N scales, taken on outer surface of specimens, and sectional microhardness, it is anticipated that in many instances case depth, hardness and microstructural modification as well as strength of core material will exert considerable influence on surface superficial hardness values.

For these reasons it appears that standards of acceptance based on surface hardness alone are not generally justifiable although they may serve as a basis for comparison after true values have been ascertained. It is suggested that whenever possible suitable pilot parts be selected from production lots of nitrided parts to furnish microhardness data to augment superficial evaluations.

When the use of structural grades other than specific nitriding steels is justified, the depth hardness curves presented in this study may serve as an indication of expectancy, with the reservation that these curves apply only to single heats of steel and that variations may normally be anticipated as a result of differences in analysis and modifications of nitriding procedure.



ABOVE

FIG. 7—Typical structure of nitrided case of nitralloy G, modified, nitrided 144 hr at 950°F, with 30 pct dissociation. Magnification 200X.

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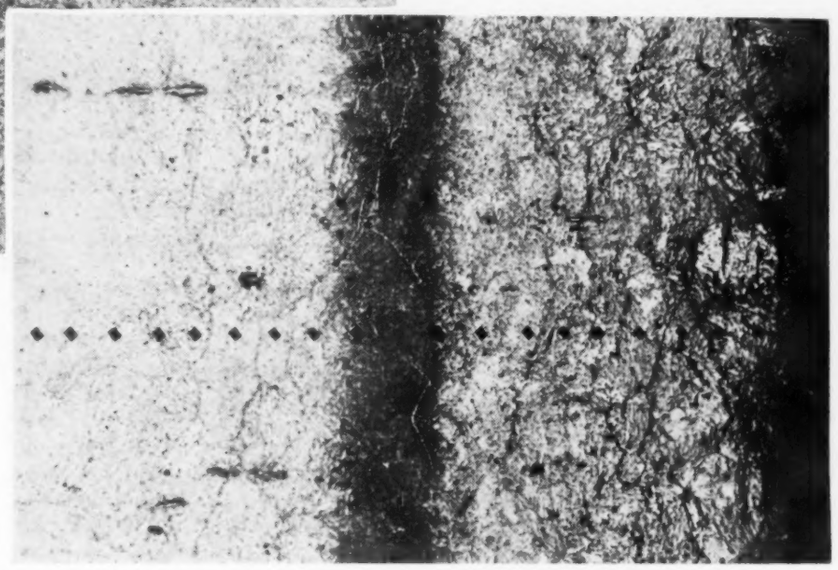

BELOW

FIG. 8—Structure of nitrided case of nitralloy G modified, nitrided at 1000°F for 144 hr with 30 pct dissociation, showing traverse of microhardness impressions. Magnification 200X.

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The Welding of Nickel-Alloy Steels

Having introduced the factors influencing weldability and hardenability of nickel-alloy steels last week, the author now describes in this second section of a four-part article various tests, supplemented with data, which are used as a means of evaluating steels for metal-arc welding. Results obtained from physical tests conducted in the selection of welding electrodes are also presented.

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TEE-BEND TEST — A test originated by the Navy Dept. as a means of evaluating steels for welding is the tee-bend test. The tee-bend specimen is prepared by attaching a piece of 4 in. high by means of double fillet welds to a plate, usually 12 x 24 in. of the material being tested. The cross piece is twice the thickness of the plate and is welded to the plate with the length of the welds perpendicular to the direction of rolling. Pieces 12 x 1 1/4 in. with the welded T across the short dimension are cut out of the plate and bent in a special jig by means of a plunger applied at the center of the face opposite the T. The angle of bend before fracture, the maximum load, and the type and location of the fracture are all taken into consideration in evaluating the weldability of the material.

Tee-bend tests were made on a number of low-alloy high-tensile steels under the direction of the Navy Dept. to determine their suitability for welded ship construction. As reported by Ellinger, Bissell and Williams[5], these steels were required to meet 50,000 psi min yield point and min elongation of 20 pct in 8 in. Tests were made on ¼-in., ½-in. and ¾-in. plates in both the as-rolled condition and after normalizing at 1650°F for 1 hr. Composition and tensile properties of four steels containing nickel that were included are given in table IV.

All welds were made by the same operator, using direct current, reversed polarity and organic covered (E6010) electrodes from the same source. Electrode size and current conditions for the three plate thicknesses shown below.

Plate Thickness, In.	Electrode Size, In.	Welding Current, Amp	Arc Voltage, Volts
¼	⅛	100 to 105	26 to 28
½	5/32	130 to 135	26 to 28
¾	3/16	160 to 170	26 to 28

Plates were welded at room temperature and additional plates were welded at 10°, 0°, −10° and −20°F to simulate cold weather conditions. Effect of welding on hardness of the nickel-steel plates is shown in table V.

A statistical method of evaluation was used. Specimens were tested in quadruplicate to represent each condition. The maximum bending load and the angle of bend before fracture is shown graphically in figs. 5 and 6.

Relation of Different Types of Weldability Tests— A very comprehensive report of the effect of nickel on weldability of steels was made by Jackson and

TABLE IV

Chemical Composition and Tensile Properties of Four Steels (Ellinger, Bissell, and Williams)

Steel No.	Thickness, In.	Composition, Pct						Yield Point		Tensile Strength		Elongation (8 In.)	
		C	Mn	Si	Ni	Mo	Cu	As Rolled	Normalized	As Rolled	Normalized	As Rolled	Normalized
								Psi	Psi	Psi	Psi	Pct	Pct
146	¼	0.10	0.44	0.16	1.92	.....	1.06	59,000	57,700	71,100	68,500	27.7	28.3
	½	0.09	0.42	0.17	1.94	.....	1.00	53,300	55,900	68,300	67,700	26.6	28.1
	¾	0.10	0.38	0.16	1.90	.....	1.01	49,200	50,400	67,000	66,100	27.4	28.5
147	¼	0.11	0.57	0.15	2.03	.....	1.08	59,900	60,200	75,300	73,600	26.5	28.2
	½	0.14	0.57	0.14	1.99	.....	1.02	53,900	58,400	72,900	72,500	25.6	27.0
	¾	0.14	0.57	0.15	1.95	.....	1.08	49,700	57,600	71,600	72,300	26.3	26.5
149	¼	0.10	0.66	0.16	0.80	.....	1.00	59,700	58,600	69,700	73,200	25.2	27.7
	½	0.09	0.56	0.17	0.59	.....	1.04	58,300	57,000	72,000	71,100	25.0	22.6
	¾	0.11	0.56	0.17	0.60	.....	1.16	54,700	53,300	70,300	69,600	28.3	28.6
150	¼	0.14	0.59	0.16	2.32	0.12	0.13	62,600	51,400	75,100	69,000	24.0	24.8
	½	0.16	0.59	0.18	1.90	0.10	0.14	51,100	47,700	71,200	68,900	26.5	27.4
	¾	0.19	0.54	0.18	2.04	0.07	0.14	47,300	48,200	72,400	71,500	27.1	28.2

TABLE V

Effect of Welding on Hardness of Plate Materials (Ellinger, Bissell and Williams)

Steel No.	Plate Thickness, In.	Original Plate, Vickers No.		After Welding, Highest Value, Vickers No.		Increase of Hardness, Vickers No.	
		As Rolled	Normalized	As Rolled	Normalized	As Rolled	Normalized
146	¼	156	155	185	190	29	35
	½	150	150	198	200	48	50
	¾	154	149	206	200	52	51
147	¼	164	164	251	240	87	76
	½	164	158	238	271	74	113
	¾	171	157	223	214	52	57
149	¼	165	160	208	198	43	38
	½	158	156	195	193	37	37
	¾	153	152	197	188	44	36
150	¼	168	158	224	223	56	65
	½	152	150	209	229	57	79
	¾	155	157	208	225	53	68

Luther[5]. The investigation included not only hardness surveys, T-bend, face and root bend, V-notched slow bend and notched impact tests of welds but also a study of the mechanical properties of the steels before welding. The authors advanced two reasons for the choice of nickel steels. First, nickel is soluble in ferrite and may be added to steel without the complication of carbide formation and second, nickel is the most widely used alloying element in the high-tensile low-alloy steels.

Twenty-four steels comprising three series were tested. In the first series carbon was held within the limits 0.17 to 0.20 pct and nickel varied from 0 to 3.63 pct in order to determine the nickel effect. In the other two series, nickel was held at 2.70 pct and 3½ pct respectively and carbon varied from less than 0.10 pct to 0.40 pct. The effect of nickel additions on mechanical properties of 0.20 pct C steel is shown graphically in fig. 7.

[5] *"The Tee-Bend Test to Compare the Welding Quality of Steels," by G. A. Ellinger, A. G. Bissell, M. L. Williams, National Bureau of Standards Research Paper RP* 1444, *January* 1942.

[6] *"Weldability Tests of Nickel Steels," by C. E. Jackson and G. G. Luther; Welding Journal, October* 1941.

Eight steels were selected from commercial heats but in order to cover the desired range in carbon and nickel contents it was necessary to supplement these steels with 80-lb induction melts. All steels were rolled into ½-in. thick plates and normalized for 1 hr at 1650°F in a controlled-atmosphere furnace to eliminate variations that might exist due to differences in fininshing temperature of rolling. Chemical analysis and tensile properties are listed in table VI.

Fig. 8 shows the carbon effect on strength and ductility of 2 pct and 3½ pct nickel steels. The carbon effect on notched bar impact properties of the two series and relation of impact properties to tensile strength in carbon and nickel steels is shown in figs. 9 and 10.

In making the welds, full automatic control was

TABLE VI

Compositions and Properties of Various Steels (Jackson and Luther)

Steel No.	PERCENT C	Mn	Si	Ni	Yield Strength, Psi	Tensile Strength, Psi	Elongation, Pct	Reduction of Area, Pct	Maximum Hardness Knoop	V-Groove Root Bend Elongation, Pct	Charpy (V-Notch) Bead Weld Ft-Lb	T-Bend Degrees	Slow-Bend Degrees
SERIES NO. 1—(C, 0.17 to 0.20 Pct)													
1C	0.17	0.40	0.39	....	41,650	63,650	43.6	69.0	220	30.5	108	68	35
5B*	0.19	0.41	0.14	....	39,700	62,300	30.7	....	208	36.0	120	74	41
2C*	0.17	0.45	0.25	0.46	52,200	67,050	38.9	68.8	254	28.0	112	74	34
3C*	0.17	0.46	0.23	1.43	54,200	70,500	42.0	68.2	270	25.5	124	67	33
4C	0.20	0.70	0.32	2.31	59,800	83,400	32.1	62.7	378	6.5***	59	45	7
5C**	0.19	0.57	0.22	2.34	56,300	80,400	31.4	53.5	329	27.0	32	32	9
6C	0.18	0.63	0.48	3.38	70,400	84,100	34.3	63.2	342	22.0	52	35	6
7C*	0.18	0.53	0.31	3.46	56,500	79,550	32.8	60.5	360	24.0	71	40	11
8C*	0.19	0.40	0.18	3.63	53,750	79,650	33.9	62.3	358	5.0	65	35	12
SERIES NO. 2—(2.0-2.5 Pct Nickel Steel)													
9C*	0.028	0.19	0.00	2.08	52,250	57,300	45.0	77.1	173	32.0	129	64	49
10C	0.04	0.22	0.23	1.98	49,800	62,300	37.5	73.7	222	4.0***	182	73	61
11C	0.06	0.37	0.17	2.27	43,700	59,850	41.4	69.0	218	30.5	146	77	37
12C	0.09	0.47	0.13	2.03	50,100	63,800	42.1	70.5	218	29.5	109	60	35
13C	0.14	0.52	0.35	1.90	57,400	74,300	38.6	67.0	288	28.5	93	61	19
5C**	0.19	0.57	0.22	2.34	56,300	80,400	31.4	53.5	329	27.0	27	31	9
4C	0.20	0.70	0.32	2.31	59,800	83,400	32.1	62.7	378	6.5	59	45	7
14C*	0.28	0.68	0.20	2.25	69,500	93,200	32.1	56.4	440	19.0	29	..	2
15C	0.32	0.80	0.34	2.23	68,200	101,200	31.0	58.9	584	9.5	29	21	3
16C	0.41	0.74	0.40	2.51	81,700	118,500	22.9	45.9	552	3.5	14	16	3
SERIES NO. 3—(3.5 Pct Nickel Steels)													
17C	0.08	0.55	0.12	3.40	58,900	71,800	42.1	71.0	278	30.0	107	63	25
18C	0.09	0.61	0.15	3.36	58,300	73,100	37.8	68.3	288	26.0	83	56	21
19C	0.12	0.51	0.45	3.37	65,700	79,750	33.2	65.0	329	25.5	66	45	9
20C	0.15	0.52	0.38	3.43	64,700	79,800	37.9	65.7	378	29.0	63	36	7
7C*	0.18	0.53	0.31	3.46	56,500	79,550	32.8	60.5	360	24.0	71	40	11
6C	0.18	0.63	0.48	3.38	70,400	84,100	34.3	63.2	342	22.0	52	35	6
8C*	0.19	0.40	0.18	3.63	53,750	79,650	33.9	62.3	358	5.0	65	35	12
21C	0.23	0.48	0.19	3.35	58,650	85,850	30.1	61.3	492	13.0	37	24	8
22C	0.26	0.58	0.36	3.35	68,600	90,250	33.2	59.2	478	.....***	36	14	3
23C	0.30	0.61	0.38	3.35	71,700	94,400	32.1	59.4	520	.....***	31	12	3
24C	0.41	0.81	0.50	3.37	81,000	119,300	22.9	45.4	620	.....***	11	3	2

* Commercial hot-rolled steels.

** Commercial steel cut transverse to direction of rolling.

used to minimize variables. Welds were made with 3/16-in. heavily coated, reversed polarity mild-steel electrodes.

Single V-Groove Weld Test—For this test the plates were bevelled for a 60° included angle and assembled on a backing strip with a root spacing of 3/16 in. Welding was performed in a direction transverse to that of rolling. The plates were allowed to cool between passes. The layers were deposited by beading; five or six beads were required to complete each weld joint. A current of 200 amp, and arc voltage of 30 v, and a speed of travel of 6 ipm were automatically maintained.

Two strip specimens 1.25 in. wide and 7 in. long were cut across the weld along the direction of rolling. One of these specimens was machined so as to obtain a face-bend specimen 3/8-in. thick with just enough metal taken from the face of the weld to eliminate surface irregularities.

The other, a root-bend specimen, was machined to the same dimensions with just enough metal taken from the root of the weld to eliminate surface irregularities. The top and bottom faces of both specimens were ground.

For studying bend ductility the specimens were bent either to failure by breaking or to the capacity of the qualification test jig. Face-bend specimens were placed on the female member of the jig with the face of the weld directed toward the gap of the jig. Root-bend specimens were placed on the female member of the jig with the root of the weld directed toward the gap. The angle at maximum load was noted. The specimens which showed no failure when bent to the capacity of the jig were bent further as a free bend in an

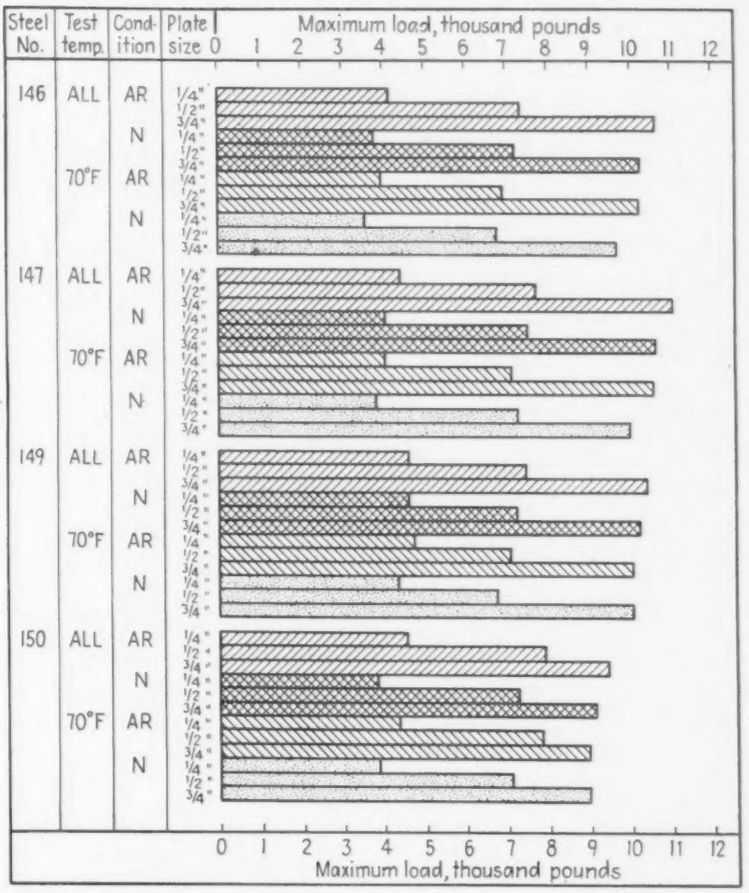
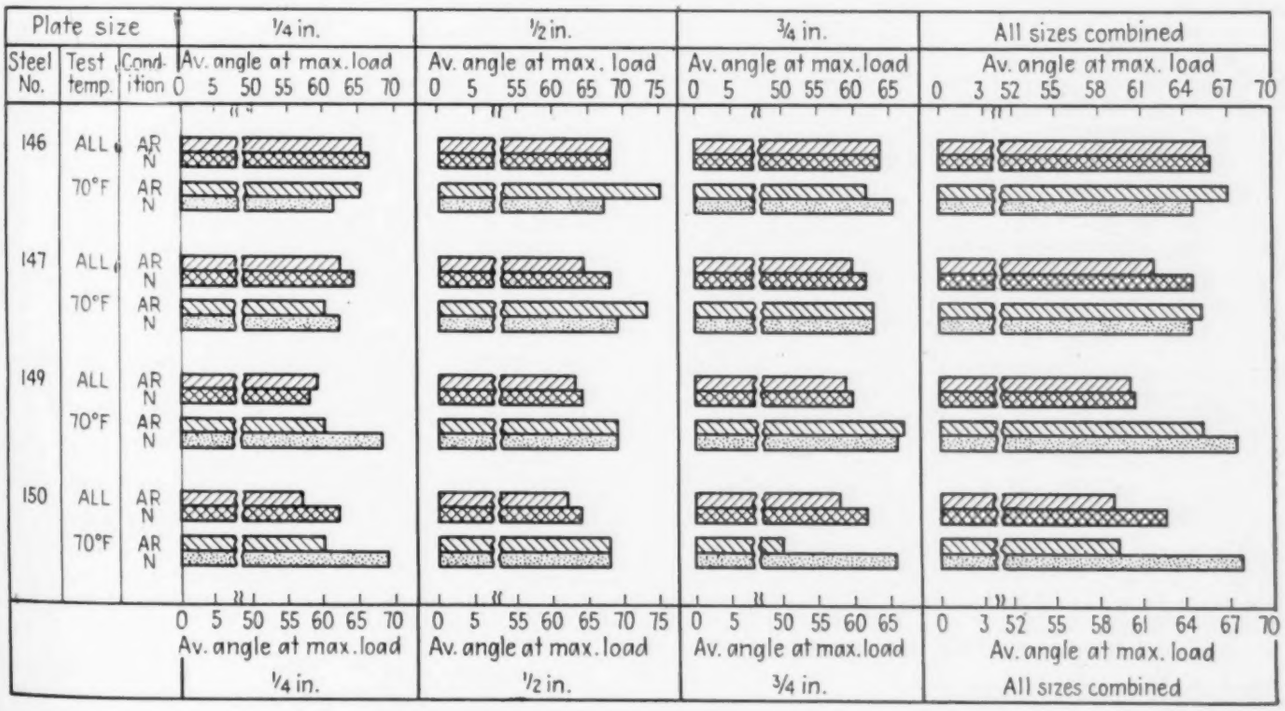


FIG. 5—Maximum loads (Ellinger, Bissell and Williams). Double cross-hatched bars—as-rolled plates, all combinations of welding and testing temperatures. Double black bars—normalized plates, all combinations of welding and testing temperatures. Single cross-hatched bars—as-rolled plates, welded and tested at 70°F. Solid black bars—normalized plates, welded and tested at 70°F.

FIG. 6—Angle of bend at maximum load (Ellinger, Bissell and Williams). Double cross-hatched bars—as-rolled plates, all combinations of welding and testing temperatures. Double black bars—normalized plates, all combinations of welding and testing temperatures. Single cross-hatched bars—as-rolled plates, welded and tested at 70° F. Solid black bars—normalized plates, welded and tested at 70° F.



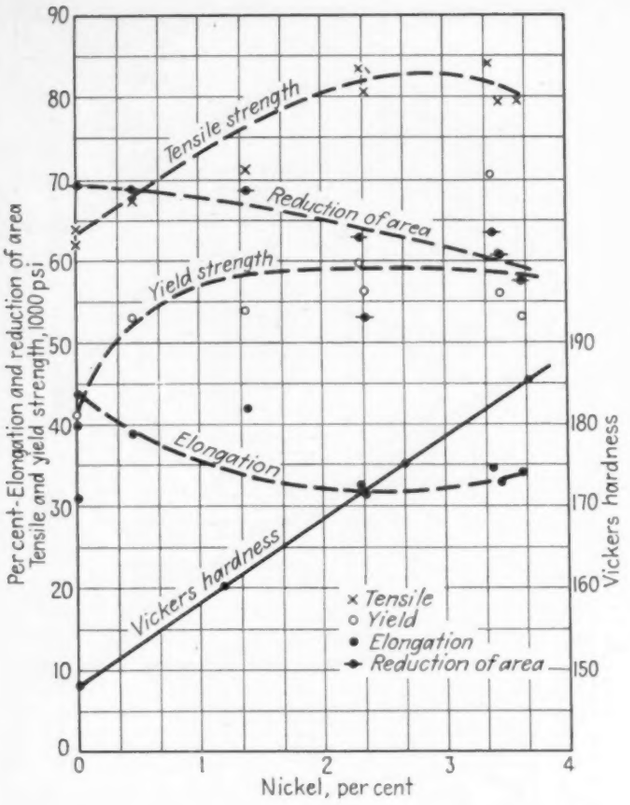


FIG. 7—Effect of Ni addition on mechanical properties of 0.17 to 0.20 pct C hot-worked and normalized Ni steels (Jackson and Luther).

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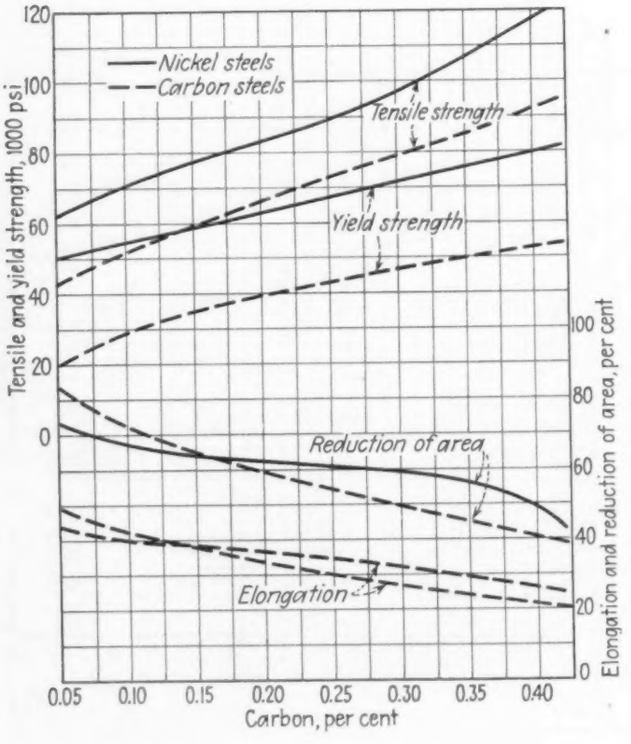
FIG. 8—Effect of carbon content on the tensile properties of hot-worked and normalized steels (Jackson and Luther).



arbor press. The elongation across the weld between 2-in. gage marks was determined after failure.

T-Bend Test—T-bend specimens were made by joining a section 4 in. in length to a 12-in. section, using fillet welds with a throat dimension of ¼ in. The fillet welds were made with the same type of electrodes that were used in previous tests; a current of 175 amp, an arc voltage of 26, and a speed of travel of 6 ipm were maintained automatically.

Two T-bend specimens 1¼ in. wide were sawed from the assembly and tested in a jig. The specimen was held securely to prevent any side or end movement and to force the bending to occur uniformly at the toe of each fillet when pressure was applied to the back of the specimen by means of the plunger. The angle to which the base of the T was bent at maximum load was noted together with the load and type of fracture that occurred at failure.

For the V-notched slow-bend test, single-bead welds were deposited on plates 6 in. wide by 7 in. long by ½ in. thick by using automatic welding, (3/16-in. electrodes with 175 amp, 26 v, and a speed of travel of 6 ipm) transverse to the direction of rolling. Strips were cut 1½ in. wide transverse to the direction of the bead weld. Only sufficient metal was removed from the top surface to eliminate irregularities. Material was then removed from the lower surface to obtain a specimen 0.375-in. thick with a ground finish on face surfaces. The specimens were etched in a 5 pct Nital solution and the location of the V-notch was determined by scribing a line on the side of the specimen parallel to and at a distance of 0.315 in. from the bottom of the specimen. The V-notch was located at the point of intersection of this line with the line of fusion between the weld metal and the plate material. In this manner the apex of the standard V-notch was machined tangent to the fusion line. For comparison a similar specimen prepared from the unaffected plate material was also tested.

The specimens were bent to failure in the qualification test jig with the V-notch facing the female part of the jig. The angle at maximum load of each specimen was noted and stress-strain diagrams were obtained.

For the V-notched impact test a welded test plate similar to that used for the V-notched slow-bend test was prepared. From this, three standard (0.394 x 0.394 x 2.165 in.) notched-bar bead-weld specimens were prepared. The V-notch was located in a manner identical to that used for the V-notched slow-bend test specimens.

The notched bars were broken in an Amsler pendulum-type machine at temperatures between 70° and 75°F. The effect of increase in nickel for a 0.17 to 0.20 pct carbon steel is indefinite. The relation is more consistent in the carbon series of 2 and 3.5 pct nickel steels.

Knoop hardness numbers were determined for the steels used in the investigation. A load of 0.2 kg was used in all cases. The length of the indentation was measured to ±0.5 micron. Knoop (0.2 kg) hardness numbers were determined with the long diagonal parallel to and also across the direction of rolling. Hardness values represent an average of 10 to 20 determinations.

Summary of Data on Nickel Steels—The data on the weldability of fully-killed nickel steels in this

investigation are summarized in table VI. The authors state that if a maximum Knoop hardness of 300 is set up as the limit for straightforward welding, the limits of the other tests may also be determined. For example, an identical classification of the steels will result if a minimum energy absorption of 80 ft-lb is required in the Charpy (V-notched) bead-weld impact test. If a minimum of 60° of bend at maximum load is required for the T-bend test, and if a minimum of 20° of bend at maximum load is required for the slow-bend test, the classification would be in the same order in all three of the series of steels.

In discussing the results the authors conclude that for ease in welding without the use of preheat based on the above limits, nickel would be limited to 1.43 to 2.31 pct when the carbon content is 0.17 to 0.20 pct. For the 2 pct nickel steels, carbon would be limited to the range of 0.14 to 0.19 pct, while for the 3.5 pct nickel steels, the carbon content would be limited to the range of 0.09 to 0.12 pct. These limits are tentatively set up for a standard welding technique of 175 amp current, 26 v arc length, and 6 ipm travel. Any change in welding technique will shift these limits. For example, the higher power input used for making the single V-groove weld specimens has raised the permissible nickel and carbon contents. Similarly, it is reasonable to assume that a decrease in power input should lower the limits for ease in welding. Further work will be required in order to narrow these ranges and establish the limits more accurately.

RIGHT

FIG. 9—Effect of C content on Charpy (V-notched) impact value and Brinell hardness for hot-worked and normalized steels (Jackson and Luther).

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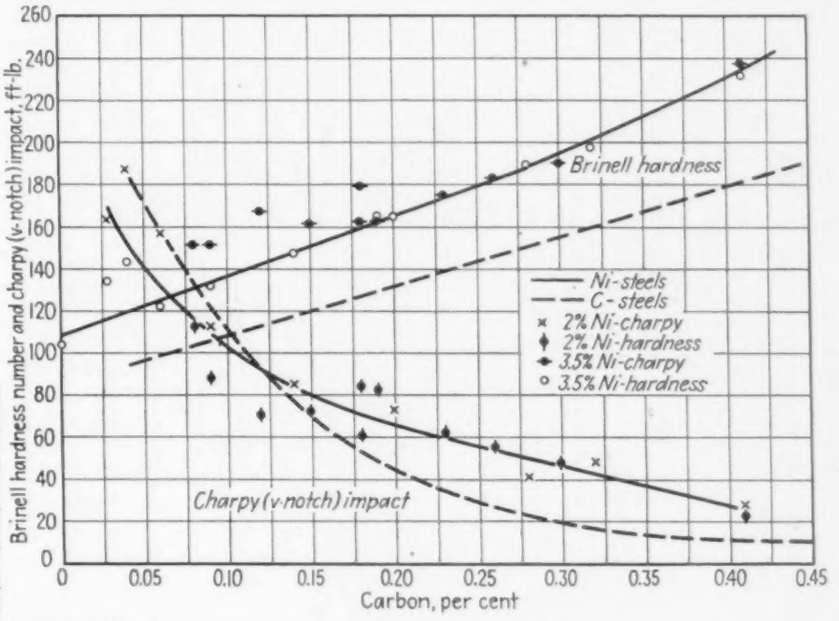
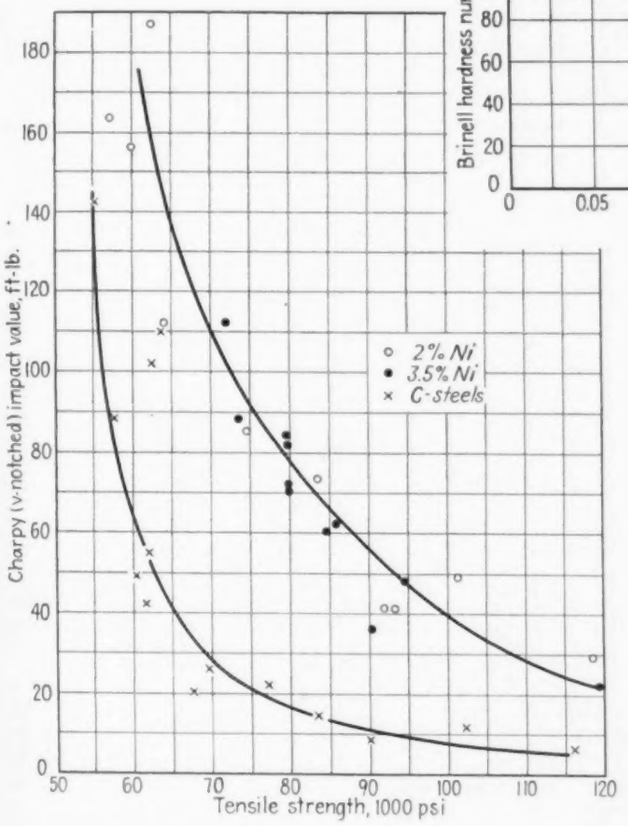
BELOW

FIG. 10—Relation of Charpy (V-notched) impact value and tensile strength for hot-worked or normalized carbon and Ni steels (Jackson and Luther).





In the particular series of steels under consideration for the above limits for weldability, it would be possible to obtain hot-worked or normalized material with a tensile strength of 75,000 psi. The nickel steels studied show better ductility for equal yield strengths and better tensile properties than plain-carbon steels for equal carbon contents. For example, steel No. 13C with 0.14 pct carbon and 1.90 pct nickel is equivalent to a hot-rolled carbon steel of twice the carbon content in tensile and yield strength. The nickel steel, however, far surpasses the carbon steel in respect to ductility and impact strength.

Reeve Cracking Test—A test to determine weld-cracking tendencies of steels that has been widely applied abroad was developed by L. Reeve. The equipment used for the Reeve test is shown in fig. 11. The base plate may be of any size, but one 18 x 24 in. permits three tests to be made. The plate edges may be sheared, gas cut or sawed, the latter method being preferred for edge No. 4 of the smaller plate on which the test weld is made.

Edges 1, 2 and 3 are fillet welded in position using 3/8-in. fillets in both ½-in. and 1-in. thick test pieces. Before making the test weld on edge No. 4 the bolts are checked for tightness.

After welding edge No. 4 the welded assembly is permitted to cool to room temperature, after which the bolts are removed and three specimens ½ in. to 5/8 in. cut from the welded plate in the location shown in the sketch. After polishing and etching

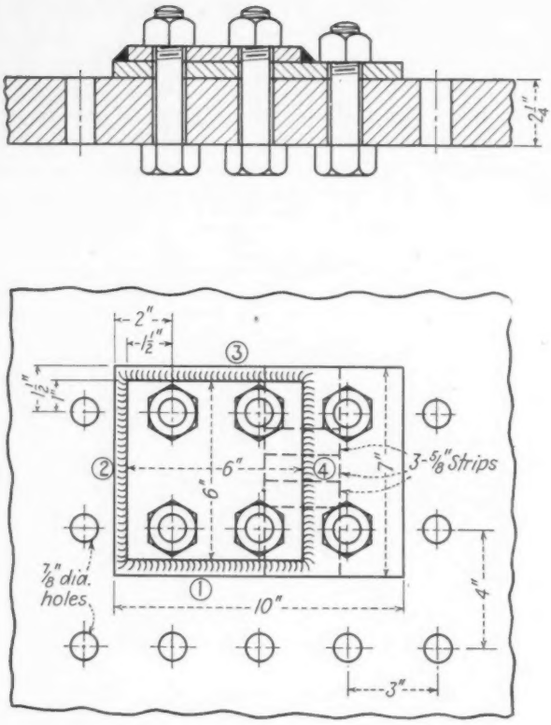


FIG 11—Reeve weld crack test equipment.

the sections, the leg lengths, throat thickness and degree of root penetration are measured with a magnifying glass with a fixed scale. The extent of cracking is determined by the magnetic powder method. Hardness measurements are also made of the weld, the heat affected zone and the base metal with a Vickers diamond hardness tester.

Selection of Welding Electrodes—In metal-arc welding the constructional steels, covered electrodes are used almost invariably. There are two general types, namely mineral coated and cellulose coated. The cellulose types have advantages for all position welding while deposits with mineral-coated rods are generally considered to be more fluid and freer from entrapped gas. Nickel can be introduced into the deposit either by using nickel steel wire in the electrode or by adding the proper amount of nickel in the electrode coating.

To maintain good arc characteristics and to secure ductile deposits, electrodes usually are made of low-carbon steel wire. In many instances alloy steels may be welded with the conventional type of carbon-steel electrodes. If, however, special properties are desired such as resistance to creep at elevated temperatures or resistance to embrittlement at low temperatures it is necessary to select an electrode that will deposit metal with an alloy content similar to that of the base material.

There will be some strengthening of the deposit of welds made in alloy steel with mild-steel electrodes because of pickup of alloy from the base material. If it is desired to secure strength in the deposit equivalent to the strength of the base material when welding high strength steels it is advisable to use alloy steel electrodes. This is particularly true if the welds are to be subjected to full heat treatment rather than to a stress relief anneal.

Tensile tests on all deposited metal as welded, in the form of built-up pads, from three types of 5/32-in. covered electrodes of different nickel content are shown in table VII.

In another set of tests of all deposited metal containing 0.12 pct carbon, 0.50 pct manganese, 2.25 pct nickel and 0.20 pct molybdenum, welded with mineral-coated electrodes, the following values were secured after stress relief anneal at 1150°F:

Position of Welding	Yield Strength, Psi	Tensile Strength, Psi	Elongation in 2 In., Pct	Reduction in Area, Pct
Flat	52,000	68,600	30.4	64.5
Vertical	55,700	70,000	29.7	53.9

In addition to the straight nickel steel electrodes and those containing nickel plus a small percentage of molybdenum, there are available a number of electrode types containing nickel, chromium and molybdenum which will develop high strength welds. Composition and average tensile properties as welded and after stress-relief anneal at 1100°F of all deposited metal from several types using 3/16 in. electrodes are listed in table VIII.

For welding some alloy steels that develop very high hardness values in the heat affected zone, austenitic chromium-nickel electrodes sometimes are used. This type of electrode is particularly useful for welding structures that cannot be stress relieved after welding as the relatively low yield strength of the deposited metal causes movement or plastic flow under stress to occur in the weld metal. Due to the high ductility of the weld metal no damage results in the welded joint.

The type containing approximately 25 pct chromium and 20 pct nickel (AISI Type 310) is the one that has given consistently the best results as there is sufficient alloy present to keep it austenitic even

TABLE VII

Tests of All Weld Metal From Nickel-Steel Electrodes

	2½ Pct Ni	3 Pct Ni	3½ Pct Ni
Tensile strength, psi	79,000	84,500	84,000
Yield strength, psi	65,000	72,500	71,200
Proportional limit, psi	62,000	65,000	59,000
Elongation (in 2 in.), pct	21.0	14.5	8.5
Reduction of area, pct	37.9	21.7	17.0

TABLE VIII

Composition and Properties of Electrodes

Type	C, Pct	Mn, Pct	Ni, Pct	Cr, Pct	Mo, Pct	V, Pct	Yield Point, Psi	Tensile Strength, Psi	Pct Elongation in 2 In.	R.A., Pct
A1	0.08	0.50	1.00	0.30	0.80	.....	70,000	92,000	16.0	30.0
A2	0.08	0.50	1.00	0.30	0.80	.....	75,000	90,000	22.0	54.0
B1	0.08	0.50	1.40	0.30	0.25	.....	83,000	90,000	18.0	.....
B2	0.08	0.50	1.40	0.30	0.25	.....	80,000	87,000	22.0	.....
C1	0.10	0.50	0.95	0.50	0.55	0.64	95,000	105,000	14.0	.....
C2	0.10	0.50	0.95	0.50	0.55	0.64	95,000	105,000	17.0	.....
D1	0.12	0.45	1.70	0.45	0.70	0.15	110,000	125,000	12.0	.....
D2	0.12	0.45	1.70	0.45	0.70	0.15	110,000	125,000	16.0	.....

Note: Chemical composition taken as the middle of the range. The first set of mechanical properties for each steel are for as welded specimens, the second for stress relieved specimens.

though there is some dilution by the base material on welding.

Composition and representative tensile properties of deposited metal are approximately as follows:

Pct C	Pct Mn	Pct Ni	Pct Cr	Yield Strength, Psi	Tensile, Psi	Elongation, Pct
0.15	1.50	21.00	26.00	58,000	90,000	36.0

A second type in great demand is the molybdenum-modified 19-9 electrode. A typical analysis of deposit and mechanical properties as obtained from the 3/16 in. diam electrode are as follows:

Pct C	Pct Mn	Pct Ni	Pct Cr	Pct Mo	Yield, Psi	Tensile, Psi	Elongation, Pct
0.09	1.46	9.45	21.45	2.08	68,000	96,000	36

A modified type of chromium-nickel austenitic steel electrode containing approximately 19 pct chromium, 9 pct nickel and 3 to 4 pct manganese was developed during the war as a substitute for 25-20 to conserve alloys. This material develops about the same properties in the weld as 25-20 but is not generally considered as satisfactory.

The manufacturers of electrodes have contributed greatly to the art of welding and industry is indebted to this group for the high-quality electrodes commercially available today. They are responsible not only for developing a high-grade product but have also in many instances been responsible for working out practices for applying it.

Next week the author deals with the intricacies of structural welding and the fabrication of pressure vessels by welding.—Ed.

Synthetic Detergent Additions in Cleaning Baths

SMALL percentages of synthetic organic detergents are said to speed up alkaline and acid pickling operations and extend the life of metal cleaning baths. Gaging the amount of residual oil by the more exact fluorescent type test indicates that the boosting effect exerted on the cleaning solution is considerable.

A synthetic detergent which exhibits a record of high solubility in water and is an efficient wetting agent is Nacconal NR (alkyl-aryl sodium sulphate) a product of National Aniline Div. of Allied Chemical & Dye Corp. It is practically neutral, exhibiting a pH in the range of 6.8 to 7.2.

Up to the time that Nacconal was developed there was no washing agent which was stable and effective in acid and alkaline solutions, as well as in the presence of metal salts. It may be noted that when judged by surface tension measurements this organic detergent is active after extended boiling with 20 pct solutions of hydrochloric, sulfuric and nitric acids respectively. It is also reasonably effective in acid concentrations of higher than 20 pct in certain cases. It maintains stability to long boiling with high concentrations of alkali. Although the solubility is very good in the hot alkaline solutions, it decreases as the solutions are cooled. Precipitation occurs from strong, cold solutions of alkali, which does not alter effectiveness since the precipitate redissolves on warming and functions in a normal manner.

An organic detergent exhibiting stability in strong acids and alkalis suggests its use in acid and alkaline baths for the cleaning of steel. In order to properly appraise the effects of the synthetic detergents on the removal of oil from steel a more exact method for the evaluation of residual oil on steel needs to be utilized. The residual mineral oil on steel can be quickly and accurately estimated by the intensity of its fluorescence when exposed under ultraviolet light. This fluorescence may be observed or photographed to provide a permanent record.

In fig. 1 is a photograph of a clean sheet of metal and an oiled sheet of metal taken with ultraviolet light. The black appearance of the clean metal will be noted whereas the oiled metal has a white appearance due to the fluorescence of the oil under ultraviolet light. Ordinary photographic paper is used as it is desired to record the range of light visible to the eye.

When Nacconol NR is added to an alkaline cleaning solution such as trisodium phosphate, it exerts a very definite boosting effect on its metal cleaning ability. The use of a mixture containing 95 pct trisodium phosphate, plus 5 pct Nacconol NR produces a clean metal surface free of all detectable oil, even when used in concentrations as low as 4 pct.

In acid cleaning of steel, additional cleaning power is imparted to the acid by the detergent as well as protection of the metal against attack by the acid. The pickling and cleaning can be effected in one and the same operation, thus reducing processing time that was previously taken up by alkaline cleaning processes which might either follow or precede the acid pickling operation. When a 10 pct sulfuric acid pickle bath is operated at 180°F and contains 0.5 pct Nacconol NR, 79 pct inhibition of acid attack is obtained.

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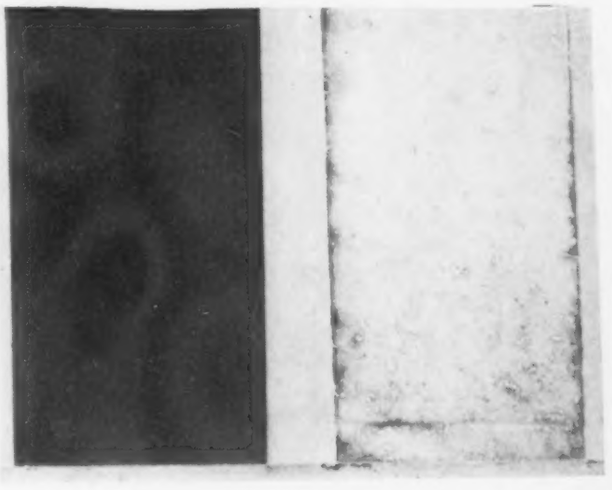
FIG. 1—Under ultraviolet light residual oil will fluoresce. At left a luminogram of clean steel; at right, oiled steel.



NATIONAL METAL SHOW

SEEKING answers to some of the perplexing manufacturing problems of the metal industry's conversion from war to peace goods production, some 30,000 designers, engineers, metallurgists and executives of the industry will visit Cleveland next week to attend the 27th Annual National Metal Congress and Exposition.

With the scheduling of some fourscore technical papers, five timely educational lectures and round table meetings on super-alloys and atomic energy, combined with eight acres of equipment and material displays by 400 manufacturers, the exposition promises to be one of the largest and most informative meetings yet staged by the American Society for Metals, sponsors of the congress.

Running from Feb. 4 to 8 at the public auditorium in Cleveland, the equipment exhibition will feature the display of many materials and processes developed for wartime uses and now available for the first time for general industrial use.

Technical sessions at the congress will be concentrated in the first three days of the meeting, with morning sessions at the Hotel Statler and afternoon sessions at the auditorium.

The American Industrial Radium and X ray Society, Inc., is holding its fifth annual convention concurrently with the National Metal Show. Technical sessions of the X ray group will be held at the Hotel Hollenden, Feb. 6, 7 and 8.

Highlight of the technical program will be the Edward de Mille Campbell Memorial lecture to be presented Feb. 6 by Maxwell Gensamer, Pennsylvania State College.

The ASM annual dinner on Feb. 7 will feature the presentation of achievement medals for outstanding contributions to the metal industry. The ASM medal for advancement of research is to be awarded to Gerard Swope, honorary president of General Electric Co. Earle C. Smith, chief metallurgist, Republic Steel Corp., will be the recipient of the 1945 ASM gold medal, while this year's Sauveur Achievement award will go to Robert S. Archer, metallurgical assistant to the vice-president, Climax Molybdenum Co.

The 1945 Howe medal to the authors of the technical paper presented before the ASM in the past year, judged to be highest merit, will be awarded jointly to Dara P. Antia, Stewart G. Fletcher and Morris Cohen, Mass. Institute of Technology.

New super-alloys for harnessing atomic energy and withstanding the tremendous heat of jet engines and gas turbines will highlight the series of round table discussions scheduled for Feb. 4, 5 and 6. Other round table discussions will cover the transformation of austenite either at constant temperature or during quenching and its related problems.

Four ASM educational courses are scheduled Thursday and Friday with outstanding authorities discussing magnesium, induction heating, corrosion of metals and effect of surface stressing of metals on endurance in repeated loadings.

Committee E-7, ASTM, and the American Industrial Radium and X ray Society, are sponsoring a symposium Friday morning, dealing largely with experience with the betatron.

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Correlated Technical Program of National Metal Congress

ALL papers listed will be presented at ASM meetings, except those preceded by an asterisk (*). ASM morning sessions will be held at the Hotel Statler; afternoon sessions are scheduled for the Cleveland auditorium. Papers preceded by an asterisk will be presented at meetings of the American Industrial Radium and X-ray Society, Inc., at the Hotel Hollenden.

Monday, Feb. 4

9:30 A. M.

"Drawability of Aluminum Alloys at Elevated Temperatures," part I, Deep Drawing Cylindrical Cups, by D. M. Finch, S. P. Wilson, and Dr. J. E. Dorn, University of California.

"Deep Drawing Aluminum Alloys at Elevated Temperatures," part II—Deep Drawing Boxes, by D. M. Finch, S. P. Wilson, and Dr. J. E. Dorn, University of California.

"New Aluminum Alloys Containing Small Amounts of Beryllium," by Dr. R. H. Harrington, General Electric Co.

10:30 A. M.

"The Partition of Molybdenum in Hypo-Eutectoid Iron-Carbon-Molybdenum Alloys," by Fred E. Bowman, Climax Molybdenum Co.

"Effect of Variations in Composition and Heat Treatment on Some Prop-

Industry meeting to stress use of wartime developments in peacetime production

ASM President

C. H. HERTY, JR., *assistant to operating vice-president, Bethlehem Steel Co., and president of the American Society for Metals, sponsor of the National Metal Congress.*

erties of 4 to 6 pct Chromium Steel Containing Molybdenum and Titanium," by G. F. Comstock, Titanium Alloy Mfg. Co.

"Iron-Manganese Alloys — Properties of Cold-Worked and Heat Treated Alloys Containing 1 to 7 pct Manganese," by Dr. R. S. Dean, J. R. Long, T. R. Graham, and R. G. Feustel, Bureau of Mines.

11:00 A. M.

"The Application of M_s Points to Case Depth Measurement," by Dr. E. S. Rowland and S. R. Lyle, Timken Roller Bearing Co.

"Mechanism of the Surface Decarburization of Steel," by W. A. Pennington, Carrier Corp.

"Graphite in Cold-Rolled, Subcritically Annealed Hypo-Eutectoid Steels," by M. A. Hughes and J. G. Cutton, Carnegie-Illinois Steel Corp.

8:30 P. M.

Round table discussion — *"Transformation of Austenite Either at Constant Temperature or During Quenching, and Its Related Problems."* Chairman, Capt. J. H. Hollomon, Ordnance Dept., Watertown Arsenal, Watertown, Mass.

Tuesday, Feb. 5

9:30 A. M.

"High Forging Temperatures Revealed by Facets in Fracture Tests," by J. Robert Strohm, Copperweld Steel Co., and W. E. Jominy, Chrysler Corp.

"Critical Points of SAE 4340 Steel as Determined by the Dilatometric Method," by D. Niconoff, Republic Steel Corp.

"Gas Evolution from Cast Steel at Room Temperature," by H. H. Johnson, L. H. Arner, and Dr. H. A. Schwartz, National Malleable & Steel Castings Co.

10:30 A. M.

"Effects of Combined Stresses and Low Temperatures on the Mechanical Properties of Some Nonferrous Metals," by D. J. McAdam, Jr., G. W. Geil, and R. W. Mebs, National Bureau of Standards.

"Temper Brittleness," by Capt. J. H. Hollomon, Watertown Arsenal.

"Fracture of Metals Under Combined Stresses," by Dr. D. J. McAdam, Jr., National Bureau of Standards.

11:00 A. M.

"Soft Soldering," by M. E. Fine and R. L. Dowdell, University of Minnesota.

"Cold Working and Heat Treatment of a 10-Karat Gold Alloy," by V. H. Patterson and B. N. Iannone, Bausch & Lomb Optical Co.

"Tellurium in the Iron Foundry," by J. O. Vadeboncoeur, General Motors Corp.

2:00 P. M.

"Investigation of a Type of Failure of 18-8 Stabilized Stainless Steel," by W. C. Kahn, New York Testing Laboratories; H. Oster and R. Wachtell, Metallurgist, Republic Aviation Corp.

"Influence of Carbon Content Upon the Transformations in 3 pct Chromium Steel," by Dr. Taylor Lyman, Metals Handbook, A.S.M. and Dr. A. R. Troiano, University of Notre Dame.

"Effect of Nickel on Physical Properties and Thermal Characteristics of Some Cast Chromium-Molybdenum Steels," by N. A. Ziegler and W. L. Meinhart, Crane Co.

3:00 P. M.

"Factors Affecting the Hardenability of Boron Treated Steels," by R. A. Grange and T. M. Garvey, U. S. Steel Corp.

"Quenching of Steel Balls and Rings," by Victor Paschkis, Columbia University.

"Mass Temperature Effects on Quenching 36 pct Cobalt Magnet Steel," by Benjamin Falk, Simonds Saw & Steel Co.

8:30 P. M.

Round table discussion — "Super-Alloys for High Temperature Service in Gas Turbines and Jet Engines." Chairman, C. T. Evans, Jr., Elliott Co.

Wednesday, Feb. 6

10:00 A. M.

Edward de Mille Campbell Memorial Lecture, by Maxwell Gensamer, Pennsylvania State College.

10:30 A. M.

* *"Advances in Steel Weldments in the Past Few Years,"* the Third Lester Lecture, by O. R. Carpenter, Babcock & Wilcox Co.

2:00 P. M.

"Anti-Reflection Films for Metallographic Objectives," by James R. Benford, Bausch & Lomb Optical Co.

"Detection, Causes and Prevention of Injury in Ground Surfaces," by L. P. Tarasov, Norton Co.

"The Practical Application of Statistical Methods in a Quality Control Program," by W. T. Rogers, National Tube Co.

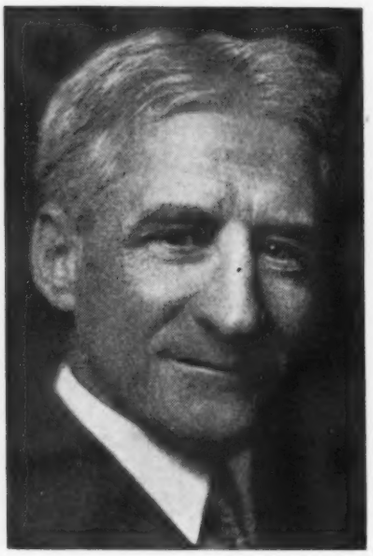
** *"X-ray Quality, Its Measurement and Significance in Industrial Radiography,"* by Dr. L. W. Ball, Triplett & Barton, Inc.

3:00 P. M.

"Stress Comparisons by Correlation with High Frequency Magnetic and Eddy Current Losses," by P. E. Cavanagh, Allen B. DuMont Labs.

"Metallurgical Characteristics of Induction-Hardened Steel," by J. W.

MAXWELL GENSAMER, *professor of metallurgy and head of the department of mineral technology, Pennsylvania State College, will deliver the* 1946 *Edward deMille Campbell Memorial lecture.*



GERARD SWOPE, *honorary president, General Electric Co., recipient of the* 1945 *ASM research medal in recognition of his contribution to many important developments in metallurgy in recent years.*

ROBERT S. ARCHER, *metallurgical assistant to vice-president, Climax Molybdenum Co., recipient of Sauveur achievement medal for outstanding achievements in the metal industry.*

Poynter, Army Air Forces, Wright Field, Dayton.

"*Induction Hardening and Austenitizing Characteristics of Several Medium Carbon Steels*," by D. L. Martin, General Electric Co., and W. G. Van Note, North Carolina State College.

* "*The Influence of Inherent Filtration of the X-ray Tube in Industrial Radiography and Fluoroscopy*," by E. D. Trout, General Electric X-ray Corp.

* "*Fluoroscopic Examination of Metallic Objects*," by D. S. Clark and B. Cassen, California Institute of Technology.

8:30 P. M.

Round table discussion — "*Atomic Energy and Its Implications.*" Chairman, C. S. Smith, University of Chicago.

Thursday, Feb. 7

9:00 A. M.

Educational lecture: Session No. 1—

Magnesium: "*Origin of Metal and Basic Properties*," by L. M. Pidgeon, University of Toronto.

Induction Heating: "*Principles and Theory of Induction Heating*," by H. B. Osborn, Jr., Ohio Crankshaft Co.

Surface Stressing: "*The Problem Defined*," by Prof. H. F. Hoore, University of Illinois.

Corrosion: "*Basic Principles of Metallic Corrosion*," by Dr. C. W. Borgmann, University of Colorado.

10:00 A. M.

* "*Gamma Ray Examination of Rail Welds in the Moffat Tunnel*," by R. McBrian and R. W. Parcel, Denver & Rio Grande Western Railroad.

* "*Radium's Position in Industrial Radiography of the Future*," by Lt. D. H. Wise, USNR, I.N.M., San Francisco.

* "*Device and Method of Quantitative Analysis by X-ray Diffraction*," by S. A. Brosky, Pittsburgh Testing Laboratory, Pittsburgh.

EARLE C. SMITH, *chief metallurgist, Republic Steel Corp., to be awarded the ASM Gold Medal for outstanding metallurgical knowledge and mature ability in the diagnosis and solution of metallurgical problems.*

10:30 A. M.

Educational Lecture: Session No. 2—

Magnesium: "*Magnesium Structural Design*," by J. C. Mathes, Dow Chemical Co.

Induction Heating: "*Induction Heating Circuits and Frequency Generation*," by P. H. Brace, Westinghouse Electric Corp.

Surface Stressing: "*Measurement of Stresses at Surface*," by W. M. Murray, Society for Experimental Stress Analysis.

Corrosion: "*Effect of Composition and Environment on Corrosion of Iron and Steel*," by C. P. Larrabee, Carnegie-Illinois Steel Corp.

2:00 P. M.

* "*The Radiography of Captured Enemy Equipment by the U. S. Navy*," by Lt. D. T. O'Connor, USNR, Ordnance Investigation Laboratory, Indian Head, Md.

* "*X-ray in the Inspection of Ammunition*," by Capt. R. E. Thorpe, USA, Iowa Ordnance Plant, Burlington, Ia.

* *"Radiography for Development and Control of Aluminum Alloy Spot-welding,"* by G. W. Scott, Jr., Armstrong Cork Co.

4:30 P. M.

Educational Lecture: Session No. 3—
Magnesium: *"Castings,"* by N. E. Woldman, Bendix Aviation Corp.
Induction Heating: *"Practical Application of the Motor-Generator Type of Induction Heating (Frequency up to 10,000 Cycles,"* by W. G. Johnson, Caterpillar Tractor Co.
Surface Stressing: *"Methods of Applying and Tests Used Including Carburizing and Nitriding,"* by J. O. Almen, Research Laboratories, General Motors Corp.
Corrosion: *"Corrosion Resistance of Stainless Steels and High Nickel Alloys,"* by W. O. Binder, Union Carbide & Carbon Research Laboratories.

7:30 P. M.

Annual ASM banquet and presentation of awards, Hotel Statler, grand ballroom.

Friday, Feb. 8

9:00 A. M.

Educational Lecture: Session No. 4—
Magnesium: *"A Survey of Wrought Magnesium Alloy Fabrication,"* by J. V. Winkler, Dow Chemical Co.
Induction Heating: *"Practical Applications of High Frequency Induction Heating (100,000 Cycles and Up),"* by J. W. Cable, Induction Heating Corp.
Surface Stressing: *"Stressing Axles and other Railroad Equipment by Cold Rolling."* by O. J. Horger, Timken Roller Bearing Co.
Corrosion: *"Corrosion of Aluminum and Magnesium,"* by E. H. Dix, Jr., Aluminum Co. of America.

10:00 A. M.

* Symposium: Committee E-7, ASTM and X-ray Society. Chairman, D. M. McCutcheon, Ford Motor Co.
* *"The Betatron,"* by D. W. Kerst, University of Illinois.
* *"Discussion of Rock Island Arsenal Betatron,"* by D. W. Marchant, Rock Island Arsenal.
* *"Discussion of Naval Research Laboratory Betatron,"* by H. F. Kaiser, Naval Research Laboratory, Anacostia Station, D. C.
* *"European Induction Accelerators,"* by H. F. Kaiser, Naval Research Laboratory, Anacostia Station, D. C.
* *"Electron Accelerator and the Two Million Volt Resonance Transformer Radiographic Equipment,"* by E. E. Charlton, General Electric Co.
* *"Radiography with the Two Million Volt Electrostatic Generator X-ray Machine,"* by R. J. Van de Graaff, Massachusetts Institute of Technology.
* *"Naval Experience with the Two Million Volt Electrostatic Generator Radiographic Equipment,"* by Lt. D. T. O'Connor, USNR, Ordnance Investigation Laboratory, Indian Head, Md.
* *"High Speed Radiography,"* by Dr. C. M. Slack, Westinghouse Electric & Mfg. Co., E. Pittsburgh.
* *"Frankford Arsenal Experience with High Speed Radiography,"* by E. R. Thilo, Frankford Arsenal, Philadelphia.

10:30 A. M.

Educational Lecture: Session No. 5—
Magnesium: *"Corrosion,"* by W. S. Loose, Dow Chemical Co.
Induction Heating: *"Comparison of Induction Heating with Other Methods of Heat Treating,"* by T. E. Eagan, Cooper-Bessemer Corp.
Surface Stressing: *"Progressive Stress Damage,"* by P. R. Kosting, Watertown Arsenal.
Corrosion: *"Corrosion of Copper and Brass,"* by H. L. Burghoff, Chase Brass & Copper Co.

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Exhibitors at the National Metal Congress and Exposition

. . . Material and equipment exhibits at the metal show will be housed in the Cleveland public auditorium and will be available for inspection from Feb. 4 through Feb. 8. Companies participating are listed below, together with principal items exhibited. Data on some exhibitors were not received in time for listing here. Sketches are by Joseph Kaliff, New York.

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Ace Abrasive Laboratories, New York. Laboratory diamond powders, diamond lapping compound and germicidal lamps. Booth G-605.

Adams Portable Spot Welder. Booth D-743. (See Central Corp.).

Agaloy Tubing Co., New York and Springfield, Ohio. Seamless welded and spiral brazed tubing in sizes ⅝ in. outside diameter and smaller cold drawn, high carbon and low carbon, alloys, Monel metal, nickel, Inconel, 18-8 stainless, L nickel, etc. Booth representatives, W. W. McMinn, L. M. Clark, R. North, F. Higbee. Booth D-330.

A.I.M.E.S. Engineering Co., Cleveland. A 24-in. vertical centrifugal casting machine, equipped with variable speed motor, speed range 158 to 2250 rpm. Booth representatives, R. D. Hulslander, Mrs. R. D. Hulslander, R. Hulslander, J. Stively. Booth D-744.

Air Hydraulics, Inc., Jackson, Mich. Air hydraulic presses in 2½ and 5-ton models with various types of controls. Booth representatives, R. W. Bryant, L. R. Beck, M. H. Ruvin. Booth K-631.

S. H. NEWBURN
Air Reduction

Air Reduction Sales Co., New York. Oxyacetylene equipment applied to welding, brazing, cleaning, cutting, edge preparation, hardening, etc., also various forms of arc welding. Chief booth representative, S. H. Newburn. Booth D-621.

Akron Bronze & Aluminum Co., Akron, Ohio. Viculoy beryllium-copper electrolytically pure copper, hydraulic bronze, and aluminum castings. Booth representatives, F. C. Thompson, F. M. Gore, J. H. McDuffee, A. D. Fish. Booth F-110.

R. M. ALLEN
Allegheny Ludlum Steel Corp.

Allegheny Ludlum Steel Corp., Brackenridge, Pa. Stainless, tool steel and carbide metals. Chief booth representatives, R. M. Allen, C. B. Boyne, W. R. Grunow, J. R. Kumer, Jr., R. A. Lincoln, L. F. Lippert, W. B. Pierce, W. R. Kuhn. Booth B-410.

W. D. HORNER
Allen Mfg. Co.

Allen Mfg. Co., Hartford. Hex socket set, cap, flat head cap and shoulder screws, pipe plugs, and keys. Booth representatives, W. C. Waldo, W. D. Horner, C. T. Schnell, H. Michgelson, L. G. Ullring. Booth B-142.

Allis-Chalmers Mfg. Co., Milwaukee. Arc welders, electrodes, welding accessories, power transmission equipment, electric motors and control apparatus, induction heaters, pumps and other industrial equipment. Booth C-603.

A. L. LaMASTERS
Alloy Casting Co.

Alloy Casting Co., Champaign, Ill. Heat resisting nickel-chromium castings used in high temperature furnaces; stainless steel castings used in chemical and food industries. Booth representatives, A. L. LaMasters, F. J. Staral. Booth C-113.

Alox Corp., Niagara Falls, N. Y. New basic inhibitors for the preparation of rust preventives, new cutting lubricants and coolants. New additives for automotive, aviation, diesel and industrial lubricants. Booth representatives, L. K. Lydecker, J. E. Shields, D. C. Kershner. Booth P-521.

J. D. WILLARD
Aluminum Co. of America

Aluminum Co. of America, Pittsburgh. Aluminum sheet, forgings, plate, pig, strip, foil; sand, semi-permanent and permanent mold castings, rolled bars and shapes, extrusions, welding wire, aluminum finishes. Chief booth representative, J. D. Willard. Booth C-122.

Allison Co., Bridgeport, Conn. Abrasive cutting wheels. Booth representatives, W. R. Haight, G. J. Casserly, F. F. Casterline, P. L. Wick, J. H. Sandham. Booth D-315.

Aluminum Industries, Inc., Cincinnati. Aluminum castings, permanent mold, sand and die, steel parts —hardened, ground and forged, aluminum ready-mixed paints for automotive, aircraft and industrial application. Booth representatives, R. G. Tessendorf, M. M. Carmody, W. Klayer, B. V. Keller. Booth A-334.

D. P. SMITH
Alvey-Ferguson Co.

Alvey - Ferguson Co., Cincinnati. Complete line of conveying equipment and cleaning and finishing equipment for metal parts and products. Booth representatives, D. P. Smith and L. J. Stigler. Booth G-608.

American Brake Shoe C., Electro Alloys Div., Elyria, O. Thermalloy and Amsco retorts, muffles and other furnace parts. Booth representatives, W. G. Hoffman, W. C. Whyte, W. C. George, E. A. Lerner, R. H. Schaefer, J. L. Goheen, H. S. Avery, H. E. Johnson. Booth B-122.

American Brass Co., Waterbury, Conn. Bronze welding rods, leaded high-strength commercial bronze free cutting alloy No. 286 and seamless copper tubing, and other copper and brass products. Booth D-320.

American Chain & Cable Co., Inc., Andrew C. Campbell Div., Bridgeport, Conn. Completely automatic abrasive cutting machines featuring oscillating heads; new model nibbling machines. Booth representatives, R. J. Southwell, H. G. Robinson, G. Johnson. Booth D-311.

American Chain Ladder Co. (see Snyder, Almon, O.), New York. Booth C-736.

American Cyanamid & Chemical Corp., New York. Iso-Thermo heat treatment process. Booth representatives, G. D. Johnston, F. F. Morral, W. P. Fitz-Randolph, E. M. Case, A. B. Filico, H. J. Shepard. Booth P-523.

American Cystoscope Makers, Inc., New York. Wappler borescope, an optical instrument for the inspection of internal surfaces. Cystoscope. Booth representatives J. E. Held, R. V. Lange, A. H. Diehl. Booth H-610.

American Foundrymen's Assoc., Chicago. Booth E-141.

American Gas Association, New York. Booth F-617.

American Gas Furnace Co., Elizabeth, N. J. Special burner equipment. Booth representatives, P. C. Osterman, J. Mehrman, J. E. von Maur and E. C. Cook. Booth C-110.

American Machine & Metals, Inc. (see Riehle Testing Machine Div.), East Moline, Ill. Booth E-604.

American Machinist, New York. A publication. Booth H-604.

American Measuring Instruments Corp., New York. Vernier type tools, Amic comparator and Amic opto-indicator. Booth representatives, N. S. Stern, E. P. Cahn. Booth F-130.

C. A. LEDERER
American Photocopy Equipment Co.

American Photocopy Equipment Co., Chicago. Photocopying systems applied to industrial and commercial uses. Booth representatives, C. A. Lederer, W. Cohen, H. Hobart, J. W. Lane, H. Berman, B. Harris. Booth A-321.

American Society for Metals, Cleveland. Booth C-114.

American Welding & Mfg. Co., Warren, Ohio. Booth A-739.

R. J. THOMPSON
Ampco Metal, Inc.

Ampco Metal, Inc., Milwaukee. Ampco metal, sand and centrifugal castings, safety tools, beryllium copper and Monel metal, resistance welding electrodes, pumps and alloys and other specialties. Booth representatives, R. J. Thompson and R. W. Uecker. Booth D-611.

Anderson Brothers Mfg. Co., Rockford, Ill. Hand and power hydraulic presses, hand and power scrapers and balancing ways. Booth representatives, S. F. Anderson, R. F. Anderson, W. E. Gunnerson, C. R. Roderick. Booth D-310.

Anderson Oil Co., F. E., Portland, Conn. Booth H-621.

R. B. ANNIS
Annis Co., R. B.

Annis Co., R. B., Indianapolis. Magnetizing and demagnetizing equipment, electric etchers, low frequency induction heating units, special testing equipment. Booth representatives, R. B. Annis, C. A. Fay. Booth I-627.

C. H. MOCK
Ansco Div., General Aniline & Film Corp.

Ansco Division, General Aniline & Film Corp., Binghamton, N. Y. Ansco X ray products for industrial use and Ansco color products, including diffraction patterns and densitometers. Booth representatives, C. H. Mock, J. D. Coil, R. L. Kleypas and R. R. Stoler. Booth E-137.

R. W. MORRISON
Aro Equipment Co.

Aro Equipment Co., Bryan, Ohio. Portable rotary pneumatic tools and industrial lubricating equipment. Booth representatives, R. W. Morrison, J. E. Allen, C. W. Ginter, E. L. Jackson, M. K. Bryant. Booth C-633.

C. J. MEISTER
Atlas Metal Stamping Co.

Atlas Metal Stamping Co. and Atlas Tool Designing Co., Philadelphia. High precision assemblies, including radar units for computing target distance and for controlling azimuth scanning range in aircraft radar. Chief booth representative, C. J. Meister. Booth B-741.

Austenal Laboratories, Inc., New York. Castings made by Microcast process for various industrial uses. Booth representatives, J. J. Erdmann, P. F. Collins, C. P. Brooks, A. W. Merrick, C. F. Bower. Booth G-604.

G. H. JOHANSON
Automatic Temperature Control Co., Inc.

Automatic Temperature Control Co., Inc., Philadelphia. Time and time-temperature controls for metal producing and finishing processes; motorized controls for fuel-air valves and for damper and furnace burner operation. Booth representatives, G. H. Johanson, W. L. Hunt, J. C. Whiddett, I. G. Johanson, W. C. Bellis. Booth B-310.

Automatic Transportation Co., Chicago. Material handling equipment. Booth A-405.

Automotive & Aviation Industries, Philadelphia. A publication. Booth A-131.

Avery Engineering Co., Cleveland. Airgard window ventilators, drinking water coolers, sun screens. Booth representatives, L. T. Avery, J. Wilhem, D. McLean, W. Leonard. Booth C-630.

• B •

Baker-Raulang Co., Cleveland. Power industrial trucks, tractors and cranes. Booth representatives, D. L. Darnell, G. B. Davis, M. W. McMillan, E. I. Walsh, H. B. Greig, H. C. Seeley. Booth D-604.

Barco Machine Products Co., Cleveland. Kool-vent awnings, surface plates and angle irons, machine products, gages. Booth representatives, W. A. Kenerson, R. L. English, H. W. Dreifort. Booth C-709.

E. J. HEIMER
Barrett-Cravens Co.

Barrett - Cravens Co., Chicago. Material handling equipment, including electric drive lift trucks, platform trucks, hand trucks, barrel storage equipment. Booth representatives, E. J. Heimer, A. M. Barrett, H. M. Donnelly, O. L. Jenkins, R. L. Hillard, H. C. Morrison, O. M. Lund. Booth C-624.

Bath Co., Cyril, Cleveland. Universal contour bending machines, power press brakes and new line of hydraulic metal forming equipment for carbon and stainless steel and aluminum. Booth representative, L. L. Collins. Booth B-736.

L. B. McKINLEY
Bausch & Lomb Optical Co.

Bausch & Lomb Optical Co., Rochester, N. Y. Improved apparatus for microscopic examination and photography of metals, including new type of polarized light compensator for examination of opaque minerals. Booth representatives, L. B. McKinley, I. L. Nixon, C. C. Nitchie, M. H. Stevens, P. Stoehr. Booth B-141.

Bell & Gossett Co., Morton Grove, Ill. Line of quenching equipment for heat treating including oil coolers, quench tanks, pumps, and controls. Booth representatives, E. J. Gossett, W. P. Gossett, W. A. Boone, R. E. Moore, E. L. Malm. Booth G-617.

Bellis Heat Treating Co., Branford, Conn. Edicurrent heating, rapid salt bath quench, Lavite heat treating bath. Booth representatives, A. E. Bellis, H. R. Audet. Booth A-306.

Bergen Precision Castings Co., Pleasantville, N. Y. Booth B-118.

Beryllium Corp. of Pennsylvania, Reading, Pa. Beryllium-copper strip, rod, wire, castings, safety tools and forgings. Booth representatives, L. F. Boland, T. F. Davis, T. E. Neal, M. A. Nichols. Booth B-709.

Black Drill Co., Cleveland. Hardsteel drills, hardsteel tool bits and other hardsteel products as used for wear and heat resistant applications. Booth representatives, F. G. Gepfert, H. F. Longnecker, J. A. Remekes, C. F. Diebold, C. D. Jackson. Booth E-114.

Blackstone Mfg. Co. Booth J-603. (See Steel- Parts Mfg. Co. Div.).

Braeburn Alloy Steel Corp., Braeburn, Pa. Tool steels. Booth representatives, N. I. Stotz, J. A. Nelson, J. C. Huffman, R. N. Armstrong. Booth D-728.

Brickseal Refractory Co., Hoboken, N. J. Fire scale and soot eradicators, refractory coatings, sludge removers and interior boiler and tank coatings. Booth representatives, H.

P. Rice, J. L. Hankinson, R. L. Shade, R. Newcomb. Booth D-750.

Bridgeport Brass Co., Bridgeport, Conn. Booth A-315.

Briggs Mfg. Co., Cleveland. Nonferrous castings to customer's blueprints and specifications. Booth reprsentatives, C. H. Kuschel, D. K. Moore, A. F. Faber, Jr., M. C. Barr, V. C. Stocker, N. B. Barnard, F. J. Burrows. Booth I-621.

Brown, W. R. Chicago. (See Snyder, Almond.) Booth C-736.

Bruning Co., Inc., Charles, Chicago. Bruning (black and white)—equipment for reproducing and copying tracings, drawings, charts, graphs. Booth representatives, E. Elstead, E. Davison, D. Lynn. Booth C-741.

N. W. BASS
Brush Beryllium Co.

Brush Beryllium Co., Cleveland. Beryllium metal lump, powders, castings, alloys and beryllium fluoride; oxide crucibles and shapes. Chief booth representative, N. W. Bass. Booth H-614.

M. P. ODELL
Brush Development Co.

Brush Development Co., Cleveland. Hypersonic inspection equipment, surface analyzers, direct inking oscillographs, transient recorders. Booth representatives, M. P. Odell, H. A. Stearns, C. O. Navorska, E. M. Hensley, E. K. Downer, J. H. Halter, H. H. Hill, S. L. Pelgar. Booth E-617.

H. O. MAINZINGER
Budd Wheel Co.

Budd Wheel Co., Induction Heating Division, Detroit. Induction heat treating and heating equipment. Booth representatives, H. O. Mainzinger, H. A. Strickland, J. E. Devereaux, J. A. Moore, T. A. Davenport. Booth A-601.

Bryant Heater Co., Industrial Division, Cleveland. Industrial gas combustion equipment. Bryant Flo-mixers, Hijectors, torch burners, Lojectors and assorted blast tips and nozzles. D. A. Campbell, R. M. Buck, R. A. Clark. Booth F-610.

Buehler Ltd., Chicago. Sample preparation equipment for metallurgical laboratory, including cutters, grinders, specimen presses, polishers and optical equipment. Booth representatives, A. I. Buehler, G. W. Graves. Booth B-135.

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Cambridge Wire Cloth Co., Cambridge, Md. Metal link belting and equipment for conveying purposes and industrial furnaces. Booth representatives, F. L. Hooper, J. W. Workinger. Booth A-745.

Canadian Radium & Uranium Corp., New York. Material for taking radiographs with radium. Booth representatives, P. D. Johnson, J. S. Harris. Booth J-611.

Carboloy Co., Inc., Detroit. Carboloy cemented carbide tools, dies, wear resistant parts, diamond impregnated Carboloy wheel dressers. Booth representatives, K. R. Beardslee, E. C. Howell, H. Crump. Booth C-340.

F. J. TONE, JR.
Carborundum Co.

Carborundum Co., Niagara Falls, N. Y. Improved grinding wheels, including several new types for tool room use; refractories and Globar non-metallic electric heating elements. Booth representatives, F. J. Tone, Jr., W. T. McCargo, C. E. Hawke, J. M. Smith, B. H. Work, G. Eismann. Booth E-628.

E. VON HAMBACH
Carpenter Steel Co.

Carpenter Steel Co., Reading, Pa. Air-hardening tool steel, case hardening thread gage steel, stainless bar and strip fabricating techniques. Booth representatives, E. Von Hambach, R. V. Mann, W. M. Loos, H. S. Potter, J. W. Thompson, W. H. Kemper, G. Brumbach, W. Schlegel, C. B. Post. Booth D-102.

Central Corp., Adams Portable Spot Welder, Chicago. Adams portable spot welder. Booth representatives, R. J. Feuchtwanger, D. A. Trescott, C. P. Huge. Booth D-743.

Central Scientific Co., Chicago. Electrolytic polisher for fast preparation of metallographic specimens, photelometers for rapid chemical analyses and other laboratory devices. Booth representatives, V. F. Duensing, C. E. Widick, R. W. Vanderveld. Booth A-744.

Chace Co., W. M., Detroit. Thermostatic bi-metals. Booth representatives, C. F. Alban, H. D. Matthews. Booth A-310.

Chayes Dental Instrument Corp., New York. Abrasive mounted points using a hand grinder. Booth representatives, N. Chayes, A. C. Hanson. Booth K-601.

Chemical Rubber Co., Cleveland. Booth C-330.

Chicago Flexible Shaft Co., Chicago. Booth A-341.

Chilton Publications, Philadelphia. Booth C-150. (See THE IRON AGE and Automotive and Aviation Industries.)

B. B. MEARS
Cities Service Oil Co.

Cities Service Oil Co., New York. Cutting and grinding oils, core oils, rust removers and other industrial petroleum products. Booth representatives, B. B. Mears, J. J. Dorr, H. F. Jones, F. J. Wirth, E. E. Puls, C. L. Warnecke. Booth D-709.

C. H. SAITER
Cleveland Crane & Engineering Co.

Cleveland Crane & Engineering Co., Wickliffe, Ohio. Steelweld bending presses and new Steelweld shears. Booth representatives, C. H. Saiter, R. G. Birkin, H. T. Florence, C. L. Peterson. Booth J-604.

Cleveland Metal Processing Co., Cleveland. (See Salkover Metal Processing.) Booth I-610.

C. E. VANDERPOOL
Cleveland Pneumatic Tool Co.

Cleveland Pneumatic Tool Co., Cleveland. Pneumatic riveters, chippers, rammers, drills, grinders, sanders, rotary files and brushes, valves, hose fittings, blowguns, miscellaneous compressed air accessories. Booth representatives, C. E. Vanderpool, E. G. Henry, R. A. Hawn, E. L. Oldham, J. E. Dillon.

Cleveland Tapping Machine Co., Cleveland. Automatic tapping machine. Booth representatives, M. Grayes, G. Collier, C. E. Kitchen. Booth C-315.

Clinton Machine Co., Clinton, Mich. Portable Thomas metal disintegrator for the removal of taps, drills, reamers and for scarifying dies or piercing hardened parts. Booth representatives, A. W. Rudel, F. Bugher. Booth A-143.

Commerce Pattern Foundry & Machine Co., Detroit. (See Upton Electric Furnace Div.) Booth P-519.

Compar-Instrument Co., Detroit. (See Lieser, G. H.) Booth A-704.

F. R. BROPHY
Cramer Co., Inc., R. W.

Cramer Co., Inc., R. W., Centerbrook, Conn. Synchronous motor driven automatic time controls, including multi-contact, automatic reset, percentage timers, running time meters and time delay relays. Chief booth representative, F. R. Brophy. Booth B-335.

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F. F. DUGGAN
Deepfreeze Div., Motor Products Corp.

Deepfreeze Div., Motor Products Corp., N. Chicago, Ill. Deepfreeze industrial freezing unit. Booth representatives, G. H. Smith, F. F. Duggan, F. W. Whitcomb, C. T. Redding, A. Jones, R. V. Newbell, E. Maus, Jr., C. W. Nickening, M. C. Lanese. Booth D-714.

Delta Mfg. Co., Milwaukee. (See Manhattan Rubber Mfg. Div.) Booth A-605.

Denison Engineering Co., Columbus, Ohio. Multipresses equipped with pelleting tooling hydraulic indexing table, foil transfer tooling and reciprocating table. Booth representatives, W. C. Denison, Jr., L. Denison, W. K. Carter. Booth P-500.

Despatch Oven Co., Minneapolis. Industrial ovens and furnaces. Booth A-320.

W. F. NEWBERY
Detrex Corp.

Detrex Corp., Detroit. Degreasing equipment, solvents, stills, parts washers, compounded cleaners and dry cleaning equipment and solvents. Booth representatives, W. F. Newbery, R. W. Pflug, P. W. Moehle. Booth D-325.

Detroit Stamping Co., Detroit. DeStaCo products for jigs and fixtures, arbor spacers and shims, stampings, small and medium size, special washers, pressed metal assemblies. Booth representatives, H. C. Robeson, W. H. Roberts, J. A. Gencur. Booth D-724.

Detroit Surfacing Machine Co., Detroit. Reciprocating electric sanders. A. Ahlemann, P. Gould, O. C. Boyle, F. D. Nunemaker. Booth A-627.

DeWalt Products Corp., Lancaster, Pa. Booth D-336.

Dietert Co., Harry W., Detroit. Spectrometric equipment, rapid carbon and sulphur determinators and rapid combustion furnaces. Booth representatives, H. W. Dietert, J. A. Schuch, C. King, E. S. Hodge. Booth B-414.

Dilley Mfg. Co., Cleveland. Standard and custom built magnetic Grip-Shields. Booth representatives, W. Dilley, F. R. Uible. Booth I-622.

Dillon & Co., Inc., W. C., Chicago. Portable universal Dillon testing machine and accessories, traction dynamometers, metal thermometers and electrical testing equipment. Booth representatives, E. I. Dillon, R. E. Dillon, R. R. Dillon, G. P. Dillon. Booth I-611.

Divine Brothers Co., Utica, N. Y. Booth C-734.

L. O. KING
DoAll Co.

DoAll Co., Minneapolis. Contour metal shaping and filing machines, butt welders, band saws, gage blocks and precision measuring instruments. Chief booth representative, L. O. King. Booth B-340.

Dow Chemical Co., Midland, Mich. Magnesium ingots, sand, permanent mold and die casting, forgings; extruded rod, bars, shapes and tubing, rolled sheet and plate. Booth representatives, L. B. Grant, J. C. H. Stearns, J. C. Mathes, T. Caldwell, Jr., T. H. Smith, A. M. Lennie, J. A. Peloubet. Booth B-321.

L. V. PRIOR
Driver-Harris Co.

Driver-Harris Co., Harrison, N. J. Nichrome, Chromax and Cimet heat resisting castings, wire and ribbon, malleable products and electrical resistance wire and ribbon. Booth representatives, L. V. Prior, F. L. Driver, S. M. Tracy, G. A. Lennox, J. B. Shelby, W. E. Blythe, K. H. Hobbie. Booth A-720.

Drop Forging Association, Cleveland. Booth E-109.

Du Mont Laboratories, Inc., Allen B., Passaic, N. J. Cyclographs for rapid sorting of metal products and for recording changes in stresses in metal parts, ferrographs for inspection of magnetic materials, special cathode-ray tube test apparatus. Both representatives, L. F. Cramer, G. R. Mezger, P. E. Cavanagh, R. L. Cavanagh, M. R. Glickman. Booth A-735.

DuPont de Nemours & Co., E. I., Wilmington. Explosive rivets. Booth C-130.

Duraloy Co., Scottdale, Pa. Stainless and heat resistant castings. Booth representatives, T. R. Heyward, Jr.,

H. T. Harrison, J. J. Baum, E. M. Anger. Booth P-513.

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East Shore Machine Products Co., Cleveland. Booth A-111.

Eastern Stainless Steel Corp., Baltimore, Md. (See Industrial Steels, Inc.) Booth D-130.

Eastman Kodak Co., Rochester, N. Y. Photographic materials used by metal industry. Booths B-409 and B-415.

Elastic Stop Nut Corp. of America, Union, N. J. Elastic self-locking nuts with elastic collars. Booth representatives, H. Bishop, C. W. Dean, Jr., H. J. Forst and A. A. Weisheimer. Booth A-640.

Electro Metallurgical Co., New York. (See Union Carbide & Carbon Corp.) Booth G-621.

Electro Refractories & Alloys Corp., Buffalo. Crucibles, resin bonded grinding wheels, alloys and refractories. Booth representatives, G. S. Diamond, G. B. Michie, T. W. Campbell. Booth P-523.

Elgin National Watch Co., Sapphire Products Div., Aurora, Ill. Industrial sapphire products, including dimensional control gages and cutting tools of sapphire, illustrations of comparative performance of Elgin sapphire. Booth representatives, R. Waindle, J. Ireland, K. W. Howard. Booth D-331.

W. A. MEDDICK
Elwell-Parker Electric Co.

Elwell - Parker Electric Co., Cleveland. Industrial electric trucks, tractors, and cranes. Booth representatives, F. J. Avery, E. E. Wendt, F. H. Gill, W. H. Leahy, O. R. Heidenrich, G. C. Asplind, W. A. Meddick. Booth B-403.

Eutectic Welding Alloys Co., New York. Booth C-310.

J. A. RICHARDS
Executone Systems

Executone., Inc., New York. Intercommunication, voice-paging and industrial music broadcasting systems. Booth representatives, J. A. Richards, H. D. Hughes, J. B. Gerdes. Booth A-630.

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Fansteel Metallurgical Corp., N. Chicago. Booth P-501.

Farmers Engineering & Mfg. Co., Pittsburgh. Booth I-634.

Fawick Airflex Co., Inc., Cleveland. Constricting clutches, expanding clutches, Airflex type power take-off unit, Rotorseals with flexible metallic hose connections. Booth representatives, T. L. Fawick, J. R. Clark, J. B. Kelley, C. R. Reuter. Booth A-726.

Faxfilm Co., Cleveland. **Booth B-723.**

Federal Electric Co., Inc., Chicago. Booth P-621.

Federal Products Corp., Providence. Precision measuring instruments. Booth representatives, I. A. Hunt, T. L. Johnson, W. Weeks. Booth P-520.

Federal Telephone & Radio Corp., New York. Booth B-740.

Fibreglas Corp. Booth A-730. (See Owens, Corning Fibreglass Corp.).

Finnell System Inc., Elkhart, Ind. Floor maintenance equipment. Booth A-711.

Firth-Sterling Steel Co., McKeesport, Pa. Tool steels in bars, etched samples, etc., carbide cutting tools and dies. Booth representatives, F. Rose, G. W. Frick, O. K. Parmiter, J. P. Larkin, A. B. Corbin, A. R. Zapp. Booth B-146.

R. G. WIELAND
Forest City Foundries Co.

Forest City Foundries Co., Cleveland. Gray iron and semi-steel castings for agricultural, electrical and other industries. Booth representatives, C. F. Seelbach, W. L. Seelbach, R. G. Wieland, Dave Clark, Walter Kremser, E. M. Stollenmeyer, Harold Karls. Booth G-613.

Frontier Bronze Corp., Niagara Falls. Booth E-110.

Fulton Foundry & Machine Co., Inc., Cleveland. Meehanite castings. Booth representatives, A. C. Denison, F. L. Barton, J. C. Beattie. Booth D-624.

Foundry, Cleveland. A publication. Booth P-504.

I. J. BARBER
Fostoria Pressed Steel Corp.

Fostoria Pressed Steel Corp., Fostoria, Ohio. Infra-red equipment for baking, drying, dehydrating, preheating. Booth representatives, E. L. Bates, I. J. Barber, M. Might, L. Goble, P. Jones and G. A. Medinger. Booth C-751.

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Gamma Instrument Co., Inc., New York. Equipment for pH measurements, mirror reflex laboratory camera, metallurgical microscopes, carbon meters. Chief booth representative, C. A. Brinkmann.

E. A. FURKERT
Gas Appliance Service, Inc.

Gas Appliance Service, Inc., Chicago. Automatic silver soldering machines, flame hardening machines, gas fired air heaters and utility furnaces. Booth representatives, E. A. Furkert, F. H. Koepke, Earl Genn, F. D. Logan, P. A. Furkert. Booth A-337.

Gas Machinery Co., Cleveland. Booth F-613.

General Alloys Co., Boston. Heat resisting castings, carburizing containers and equipment, retorts and muffles, containers for molten salts and leads. Booth representatives, H. H. Harris, J. J. Tansey, C. E. Kite. Booth C-146.

General Tool & Die Co., Inc., East Orange, N. J. Machine tools. Booth C-706.

Globe Products Mfg. Co., Los Angeles. Booth A-121.

Globe Stamping Div., Hupp Motor Car Corp., Cleveland. Tumbling barrels, stamped metal and machined parts. Booth representatives, J. Remesch, R. T. Williams, G. B. Williams. Booth I-623.

Goodrich Co., B. F., Akron, Ohio. Booth I-620.

Gray-Mills Co., Evanston, Ill. Centrifugal pumps, portable coolant systems and parts cleaning systems.

Booth representatives, John Gray, R. Hollis, L. Stoddard, O. E. Marthinson, Hal Marshall. Booth C-601.

Great Lakes Steel Corp., Detroit. Booth C-730.

Gulf Oil Corp., Pittsburgh. Industrial petroleum products. Booth A-410.

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H & H Research Co., Detroit. Reciprocating action tools and accessories, surface plates and drill table vises. Booth representatives, I. J. Turnbull, W. M. Smith, M. Ehrenhaus. Booth P-522.

HPL Mfg. Co., Cleveland. Booth K-635.

Hager & Son, E. F., Queens Village, N. Y. Carbide tool grinder. Booth A-748.

Harmon & Co., Chicago. Booth F-161.

Harper Co., H. M., Chicago. Bolts, nuts, screws, washers, rivets in brass, Naval bronze, silicon bronze, monel metal and stainless steel. Booth representatives, T. Stott, K. B. Little. Booth A-727.

Harris Foundry & Machine Co., Cordele, Ga. Booth C-702.

Hart & Co., Inc., Frederick, Poughkeepsie, N. Y. Booth F-140.

Haynes Stellite Co., New York. Precision casting process, special and standard metal cutting tools, precision castings and hard facing materials. Booths G-621 to G-633.

C. E. HEIL
Heil Engineering Co.

Heil Engineering Co., Cleveland. Heat exchangers, chemical resistant tank linings, steam jet agitators, lead anodes, heating coils and tanks. Booth representatives, C. E. Heil, H. P. Heil, Howard Friedel, E. Huth, Robert Ware. Booth A-624.

P. T. FLOOD
Hercules Electric & Mfg. Co., Inc.

Hercules Electric & Mfg. Co., Brooklyn. Arc welding equipment, transformers, solenoids and rectifiers, fluorescent light transformers. Booth representatives, P. T. Flood, J. W. Lourie. Booth G-611.

Herman Stone Co., Dayton. Booth C-750.

Hevi Duty Electric Co., Milwaukee, Wis. Industrial and laboratory furnaces. Booth representatives, N. C. Bloye, B. Werra, A. H. Oberndorfer. Booth C-141.

Hines Co., Detroit. Booth A-704.

Hitchcock Publishing Co., Chicago. Booth J-601.

Holden Co., A. F., West Haven, Conn. Gas fired and electric furnaces and accessories. Booth representatives, A. F. Holden, H. Solakian, E. P. Belden, J. M. Halloran. Booth B-147.

Honan Crane Corp., Lebanon, Ind. Booth D-741.

Hoskins Mfg. Co., Detroit. Chromel heating element alloys and heat resistant castings. C. S. Kinnison, J. W. Sterenberg, W. D. Little. Booth D-741.

H. E. MARTIN
Houghton & Co., E. F.

Houghton & Co., E. F., Philadelphia. Heat treating salts, drawing compounds, quenching and cutting oils, rust preventatives, carburizers, and lubricants. Booth representatives, H. E. Martin, D. J. Richards, D. C. Miner, James McElgin, W. C. Morgan, A. L. Spencer. Booth D-337.

Hydraulic Machinery, Inc., Dearborn. Booth B-720.

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Ideal Commutator Dresser Co., Sycamore, Ill. Pneumatic tool and die grinder, pneumatic riveting hammer, magnetic chuck, dust collector, tachometers (for measuring shaft or surface speeds), live lathe centers, balancing ways, grinding wheel dressers, etc. Booth representatives, R. F. Waldo, M. A. Buettell, I. D. Applegate, P. F. Froeb. Booth C-715.

Illinois Testing Laboratories, Inc., Chicago. Indicating pyrometers, air velocity measuring instruments, temperature controllers, precision dew point indicators. Booth representatives, M. J. Rauscher, E. F. Burke, W. H. Evans, C. H. Hooker. Booth D-138.

Illinois Tool Works, Chicago. Metal cutting tools, engineered fastenings, high frequency heating equipment. Booth representatives, E. E. Valy, R. E. Wolff, E. W. Fuller, W. M. Hanneman, J. A. Callanan. Booth B-324.

C. B. BARON
Independent Pneumatic Tool Co.

Independent Pneumatic Tool Co., Chicago. Thor pneumatic and electric tools, including universal and high frequency electric types and demolition tools for mine and general construction use. Booth representatives, C. B. Baron, N. C. Hurley, Jr., W. A. Nugent, P. L. Stetler, H. H. Ritchotte, R. P. Kellen, J. F. Corkery. Booth G-603.

J. W. CABLE
Induction Heating Corp.

Induction Heating Corp., New York. Thermonic induction and dielectric heating equipment, work tables, fixtures and coils. Booth representatives, J. W. Cable, J. H. Garger, J. P. Moran, N. Levin, A. N. Hoelz. Booth D-340.

Industrial Steels, Inc., Cambridge, Mass. Booth D-130.

Industrial Tape Corp., New Brunswick, N. J. Industrial pressure sensitive tapes made of paper, cloth, cellophane and other backings. Booth representatives, R. T. Hamilton, L. B. Alexander. Booth B-746.

Infra-Red Engineers & Designers, Cleveland. (See Miskella Infra-Red Co.) Booth A-123.

Instrument Specialties Co., Inc., Little Falls, N. J. Micro-processed beryllium copper springs for various applications. Booth representatives, R. W. Carson, J. D. Roberson. Booth D-335.

International Nickel Co., Inc., New York. Products made of wrought steels, stainless steel, nickel cast iron, Ni-Resist, Ni-Hard, nonferrous castings, heat resisting alloys,

Monel, Inconel, nickel silver, Invar, Elinvar, Alnico. Booth B-102.

R. A. HASTINGS
Intercontinental Engineers, Inc.

Intercontinental Engineers, Inc., Chicago. Industrial furnaces, special machines and complete plants covering range from 400° to 4000°F. Booth representatives, W. A. Darrah, E. B. Jones, R. A. Hastings, C. P. Masure, D. E. O'Connor. Booth C-332.

Iron Age, The, New York. Copies of THE IRON AGE, editorial reprints, market and technical data. Booth C-150.

• J •

Jack & Heintz, Inc., Cleveland. Booth B-320.

Janney Cylinder Co., Philadelphia. Products made from centrifugal castings of brass, bronze, alloy iron, alloy steel, Ni-resist and Monel metal. Booth representatives, P. P. Jefferis, M. C. Johnson, J. B. Janney. Booth H-605.

Jessop Steel Co., Washington, Pa. Booth A-739.

Jones Co., C. Walker, Philadelphia. Booth I-624.

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Kelley Co., J. W., Cleveland. Industrial oils, heat treating products. Booth representatives, J. W. Kelley, A. F. Ruffner. Booth C-137.

W. D. TURNBULL
Kennametal, Inc.

Kennametal, Inc., Latrobe, Pa. Kennametal face mills, step cutters and special tools, files, wear resistant parts and solid strip finishing rolls. Booth representatives, P. M. McKenna, D. C. McKenna, A. G. McKenna, W. D. Turnbull, W. L. Kennicott, H. A. Frommelt, F. W. Pennington, R. B. Weeks. Booth B-130.

Kerr Dental Mfg. Co., Detroit. Booth I-629.

Kett Tool Co. (See Snyder, Almon O.) Cincinnati. Booth D-737.

King, Andrew, Narberth, Pa. Portable brinell, folding brinell microscope. Booth representatives, A. King, W. L. Jobe. Booth D-118.

Kinzie Stampers Div., American Machine & Gage Co., Detroit. Booth C-114.

J. H. SHOEMAKER
Kolene Corp.

Kolene Corp., Detroit. Metal cleaning and surface preparation compounds and solvents. Booth representatives, J. H. Shoemaker, W. A. Wickwire, H. G. Webster, H. L. Frick. Booth E-635.

Krouse Testing Machine Co., Columbus. Various types of stress testing machines. Booth representatives, G. N. Krouse, C. P. Roberts, E. W. Geyer. Booth A-734.

Kux Machine Co., Chicago. Presses for powdered metal parts, die casting machines and special cams. Booth representatives, J. J. Kux, George Kux, Stanley Sparr, C. Bieniasz, R. B. Kaufman, S. M. Boyd. Booth A-311.

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Lake Chemical Co., Chicago. Pipe joint compound in stick form. Booth representatives, B. Lytton, Miss Lytton. Booths C-749.

Lansing Engineering Co., Lansing, Mich. Booth A-750.

ALLEN LINDSAY
Lectroetch Co.

Lectroetch Co., East Cleveland. Lectroetch marking process for marking any metal. Booth representatives, A. R. Lindsay, A. B. Lindsay, E. Schuthenberg, D. P. Patterson, F. Boaden. Booth L-102.

Lepel High Frequency Laboratories, Inc., New York. Hardening, annealing, melting, brazing and soldering equipment for ferrous and non-ferrous metals. Chief booth representative, H. H. Watjen. Booth K-615.

A. W. HUTTON
Lempco Products, Inc.

Lempco Products, Inc., Bedford Ohio. Electric and hydraulic presses, spiral adjustable reamers and antifriction die sets. Booth representatives, J. Y. Blazek, F. J. Schwab, G. Connor, A. W. Hutton, R. C. Hall, M. M. Muhlfelder. Booth C-620.

Lester-Phoenix, Inc., Cleveland. Injection molding and die casting machines. Booth representatives, F. C. Ziesenheim, A. R. Morris, D. White, N. Lester. Booth A-330.

Lewis-Shepard Products, Inc., Watertown, Mass. Material handling equipment. Booth representatives, A. L. Lewis, F. J. Shepard, Jr., L. E. Nivling, J. P. Ascher, R. Hastings, F. A. Gray, H. M. Palmer. Booth D-617.

Lieser, George H., Berea, Ohio. Booth A-704.

Lincoln Engineering Co., St. Louis, Mo. Centralized lubricaton systems, air operated electrically operated and manually operated Lubriguns. Booth representatives G. E. Scott, M. Lawton, J. Boase, A. Woodland. Booth A-740.

N. K. KOEBEL
Lindberg Engineering Co.

Lindberg Engineering Co., Chicago. High temperature laboratory box furnace, combustion tube furnace, carbon determinator, all purpose brazing furnaces, Hyco controlled atmosphere generator, vertical gas-fired Cyclone tempering furnace. Booth representatives, C. H. Stevenson, F. A. Hansen, N. K. Koebel, D. B. Rader, L. H. Remiker. Booth D-146.

Linde Air Products Co., unit of Union Carbide & Carbon Co., New York. Oxygen distribution methods, flame cutting, flame treating and Unionmelt welding equipment, Heliarc welding torches, synthetic sapphires, rubies, and spinel, new wear-resistant materials. Booth G-621.

W. J. KENT
Lion Mechanical Works

Lion Mechanical Works, Long Island City, N. Y. Precision placer, a universal drilling and milling accessory for centering round or square stock, drilling, reaming, tapping, hollow milling one end or both ends, etc. Booth representatives, J. S. Soltys, W. J. Kent, and L. Greenbaum. Booth I-625.

Lithaloys Corp., New York. Booth A-714.

S. K. OLIVER
Lithium Co.

Lithium Co., Newark. Construction and operating features of metallic vapor atmosphere furnaces. Booth representatives, S. K. Oliver, H. J. Ness, R. June, E. M. Proyer, A. Christensen, T. La Crone, C. Thomas, M. Ness.

H. STRONG
Lord Mfg. Co.

Lord Mfg. Co., Erie, Pa. Bonded rubber mountings for shock and vibration absorption. Booth representatives, W. W. Dalton, H. Strong, J. Hutchinson, R. S. Henshaw, Duff Dean, H. A. Sheehan, W. H. Claus. Booth C-760.

J. F. WIESE
Lukens Steel Co.

Lukens Steel Co., Coatesville, Pa. Steel products, spun and pressed heads, weldments, rolls, and other items produced by subsidiary companies, the By-Products Steel Corp. and Lukenweld, Inc. Booth representatives, J. F. Wiese, G. M. Gillen, H. A. Ottey, G. A. Cardwell, W. C. Simpson, H. R. Meyer. Booth B-110.

• M •

Machinery. A publication. Booth E-133.

F. B. DOANE
Magnaflux Corp.

Magnaflux Corp., Chicago. Inspection and analysis equipment, including magnetic particle and fluorescent penetrant inspection method and brittle coating stress analysis equipment. Booth representatives, F. B. Doane, C. E. Betz, W. E. Thomas, R. N. Baughman, D. P. Walsh, C. N. Ring, Hamilton Migel, R. O. Schiebel, Jr. Booth D-113.

Magnetic Analysis Corp., Long Island City, N. Y. Magnetic analysis inspection, comparing and demagnetizing equipment. Booth representatives, W. S. Gould, Jr., T. Zuschlag, F. O. Fischer, J. D. Wilfong, Jr., V. L. Spoley, R. C. McMillen, R. R. Regen. Booth B-121.

Malleable Founders' Society, Cleveland. Booth H-607.

Mallory & Co., Inc., P. R., Indianapolis. Booth F-601.

Manhattan Rubber Mfg., Div. Raybestos-Manhattan, Inc., Passaic, N. J. Booth A-605.

Markal Co., Chicago. Industrial marking devices. Booth K-603.

Martindale Electric Co., Cleveland. Motor-driven flexible shafts for grinding, deburring, etc., rotary burs and files, protective dust masks, electric marking devices and circular saws. Booth representatives, E. H. Martindale, R. H. Martindale, R. E. Blersch, W. N. Osbun, Jr. Booth A-715.

McGraw-Hill Publishing Co., Inc., Booth H-604.

Mead Specialties Co., Chicago. Booth A-336.

Melville Shoe Corp. Booth K-621.

Metal Finishing Service, Chicago. Booth C-747.

Metal Hydrides, Inc., Beverly, Mass. Semi-rare metals, alloys, and metal hydrides. Booth representatives, D. S. Eppelsheimer, B. O. Stoothoff. Booth C-629.

Metal Progress. A publication. Booth C-114.

Metallizing Co. of America, Chicago. Dot-Weld quench-arc weld machine, Dot-Weld pistol for the reclaiming of defective castings, Mogul circulator for eliminating casting porosity. Booth representative, L. E. Kunkler. Booth I-619.

Michiana Products Corp., Michigan City, Ind. High temperature fans and alloy castings. Booth representatives, H. Klouman, H. E. Ardahl. Booth B-131.

Mid-States Equipment Corp., Chicago. Arc welders and accessories. Booth representatives, H. L. Lindblad, A. W. Lindblad, M. J. Lalick. Booth D-732.

Midvale Co., Nicetown-Philadelphia. Booth E-611.

Milne & Co., A., New York. Booth representatives, H. S. Hoyt, J. K. Hoyt, Jr., H. M. Benham. Booth D-710.

Mine Safety Appliance Co., Pittsburgh. Equipment for personal and plant protection. Booth representatives, J. B. Davies, J. W. McCrackin, R. V. Fitzpatrick. Booth B-111.

J. HANSON
Miskella Infra Red Co.

Miskella Infra Red Co., Cleveland. Infra-red ovens, appliances, sectional units and machines, Vibra-veyor processing, plastic powder preheating and conveying, insulated infra-red sectional units. Booth representatives, W. J. Miskella, J. Hanson. Booth A-123.

W. H. PHILLIPS
Molybdenum Corp. of America

Molybdenum Corp. of America, Pittsburgh. Alloys and chemicals of molybdenum, boron and tungsten, including powders, wire and electrodes. Booth representatives, W. H. Phillips, M. Hirsch, N. F. Tisdale. Booth C-133.

Monarch Steel Co., Indianapolis. Booth P-526.

Monroe Tool & Mfg. Co., Monroe, Mich. Grinding machines. Booth A-331.

M. J. RAINEY
Morse Twist Drill

Morse Twist Drill & Machine Co., New Bedford, Mass. High speed and carbon steel and tungsten carbide cutting, reaming, tapping and special tools. Booth representatives, M. J. Rainey, M. L. Dunham, H. K. Herlihy. Booth D-736.

Motch & Merryweather Machinery Co., Cleveland. Cold sawing machines featuring triple chip segmental type blades, saw sharpening machines and saw blades. Booth representatives, E. R. Motch, Jr., A. B. Einig, E. J. Kossuth, L. W. McClellan, W. R. Valentine, R. E. Mason, A. T. Hopkins. Booth E-621.

Motor Products Corp., Chicago. Booth D-714. (See Deepfreeze Div.)

Moto-Truc Co., Cleveland. Material handling equipment. Booth K-620.

Mueller Co., Niles, Mich. Booth K-623.

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J. L. PETRESKY
National Bronze & Aluminum Foundry Co.

National Bronze & Aluminum Foundry Co., Cleveland. Aluminum, sand and permanent mold castings. Chief booth representative J. L. Petresky. Booth B-751.

National Carbon Co., Inc., New York. Booth G-621.

H. L. STRAUSS, JR.
National Diamond Hone & Wheel Co.

National Diamond Hone & Wheel Co., New York. Grinding wheel dressing tools, honing stones and wheels for carbide and powder metal parts. Booth representatives, H. L. Strauss, Jr., H. L. Strauss, Sr. Booth C-712.

National Engineering Co., Chicago. Foundry sand mixers, bucket loaders, Aerators, screening and magnetic separating units and other sand handling and preparing equipment. Booth representatives, E. A. Peterson, B. Ellis, F. W. Fuller, W. G. Groskopf, L. G. Probst. Booth B-115.

G. SATHRE
National Lead Co.

National Lead Co., Cleveland. Solder, soldering fluxes, lead and lead-lined acid valves, lead-lined pipe and fittings. Booth representatives, G. Sathre, F. J. Kuhar, H. H. Bailey. Booth G-609.

Nelson Specialty Welding Equipment Corp., San Leandro, Calif. Stud welding equipment and flux-filled studs. Booth representatives, T. Nelson, W. Heller, E. A. Hoffman. Booth P-502.

New-Field Co., Los Angeles. Booth D-737. (See Snyder, Almon O.)

New Jersey Zinc Co., New York City. Zinc alloy die castings. Booth representatives, R. M. Neumann, A. E. Mervine, R. G. Kenly, R. Davison. Booth B-730.

New York Air Brake Co., New York. Hydraulic pumps and hydraulic power units. Booth representatives, D. W. Johnston, J. H. Stewart, R. L. Firth. Booth A-133.

R. E. MORRIS
Nichols-Morris Corp.

Nichols - Morris Corp., New York. Milling machines of following types: Hand lever feed; pneumatic feed and screw and lever rack and pinion cross feed. Booth representatives. R. E. Morris, W. H. Nichols, Lee Tarbox, John Connearney, H. L. Gardner, G. J. Hawkey. Booth C-634.

Nicholson File Co., Providence, R. I. Booth E-102.

North American Mfg. Co., Cleveland. Turbo blowers, gas, oil and dual-fuel burners, valves and other industrial combustion equipment. Booth representatives, G. R. Brown, G. F. Naab, Z. D. Basset, O. C. Bernhard, S. E. Shepard, O. Lutherer, N. H. Davies. Booth C-320.

C. J. WOODS
North American Philips Co., Inc.

North American Philips Co., Inc., New York. X ray spectrometer, film type X ray diffraction equipment and electronic products. Booth representatives, J. Buhler, C. J. Woods, F. G. Firth, L. J. Van Halanger, M. W. Lightcap, J. M. Constable, C. J. Gotthardt, W. Buhl, G. Kloos, M. Lee. Booth A-415.

C. W. JINNETTE
Norton Co.

Norton Co., Worcester, Mass. Industrial grinding wheels, refractories and boron carbide. Booth representatives, C. W. Jinnette, F. P. Hays, W. R. Moore, R. M. Johnson, G. A. Park, W. E. Shumway, R. Kirkpatrick. Booth D-603.

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Oakite Products, Inc., New York. Metal cleaning and rustproofing equipment. Booth E-134.

F. C. AURAND
Ohio Carbon Co.

Ohio Carbon Co., Cleveland. Motor and generator brushes, carbon contacts and specialties, insulated and uninsulated resistors and wire round resistors, and electric motors. Booth representatives, F. C. Aurand, A. K. Moulton, L. L. Stoffel, L. A. Leonard, I. W. Brandel, A. A. Stark, J. S. Owens. Booth A-634.

Ohio Overall Cleaning Co., Cleveland. Booth H-601.

Ohio Seamless Tube Co., Shelby, Ohio. Seamless and electric welded steel tubing. Booth representatives, W. C. Connelly, A. Waines, Jr., H. C. Mayer, E. W. McNeill, M. W. Freese, H. R. Lewis. Booth K-610.

W. E. BENNINGHOFF
Ohio Crankshaft Co.

Ohio Crankshaft Co., Cleveland. Induction heating equipment, crankshafts, camshafts. Booth representatives, W. C. Dunn, W. E. Benninghoff, H. B. Osborn, Jr., T. Veale, A. O. Wood, O. T. Wirth, J. F. Wilson. Booth A-324.

Ohio Steel Foundry Co., Springfield, Ohio. Fahrite heat and corrosion resistant allow castings. Booth representatives, J. E. Galvin, T. H. Harvey, E. A. Walcher, J. L. Campbell, F. Kiper, I. D. Cline, L. E. Welch. Booth D-134.

Olsen Testing Machine Co., Tinius, Philadelphia. Electro-mechanical universal testing machines with electronic high magnification recorder, dynamic balancing machines, stiffness testing machines. Booth representatives, T. Olsen, 2nd., E. M. Redstreake, G. C. Lawrie. Booth C-625.

Optron Laboratory. Booth C-750. (See Herman Stone Co.)

Osborn Mfg. Co., Cleveland. Booth B-331.

B. S. WRIGHT
Owens-Corning Fiberglas Corp.

Owens - Corning Fiberglas Corp., Toledo. Glass fibre and filament applications for electrical insulation, air conditioning, commercial equipment and general industrial use. Booth representatives, B. S. Wright, S. M. Peek, E. V. Dragics, W. C. Hyatt, G. O. Hartzell, M. P. Claytor, Paul Benner, R. E. Hunsaker. Booth A-730.

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J. L. FILBERT
Page Steel & Wire Division

Page Steel & Wire Division, American Chain & Cable Co., Monessen, Pa. Manufacturers' wires in stainless and carbon grades, round, flat and shaped, and welding electrodes and rods. Chief booth representative J. L. Filbert. Booth D-314.

C. E. KLAMM
Parker Appliance Co.

Parker Appliance Co., Cleveland. Steel, brass, stainless and aluminum hydraulic fittings, valves and mechanisms. Chief booth representative C. E. Klamm. Booth E-601.

J. HARPER
Parker-Kalon Corp.

Parker - Kalon Corp., New York. Self - tapping screws and newly developed ground thread socket set screws and Size-Mark and Gear Grip socket head cap screw. Booth representatives, John Harper, Roland Roe, A. W. Meader, B. Hagadone. Booth A-703.

Peerless Gear & Machine Co., Toledo, Ohio. Gears, pinions, racks and make-ready boxes for die-casters. Booth representatives, E. E. Laubscher, G. E. Lewis. Booth D-708.

Peninsular Chemical Products Co., Van Dyke, Mich. Booth H-631.

Penton Publishing Co., Cleveland. Booth P-504.

Peters-Dalton, Inc., Detroit. Dust collectors, spray booth and double end grinders. Booth representatives, O. A. Peters, A. J. Dalton, I. J. Belanger, O. E. Fenn. Booth B-611.

Physicists Research Co., Ann Arbor, Mich. Surface roughness measuring equipment and units for measuring waviness of bearing races. Booth representatives, J. M. Trytten, B. W. Poland, F. J. Engelke, Frank Kabat, W. G. Klager, C. B. Waggoner. Booth H-625.

Pines Engineering Co., Inc., Aurora, Ill. Automatic tube cut-off machine, pipe nipple threading machine, automatic tube bending machines. Booth representatives, B. F. Bower, E. V. Carlstein, L. Nelson. Booth A-700.

Pioneer Alloy Products Co., Inc., Cleveland. Acid resisting valves. Booth representatives, A. A. Lang, E. D'Zomba. Booth K-639.

Pond Engineering Co., Springfield, Mass. Machines showing milling and cut-off operations on bar stock, and drilling, counterboring, and tapping with magazine feeds. Booth A-625.

Porter Cable Machine Co., Syracuse, N. Y. Grinding and surfacing machines and automatic feed tables. Booth representatives, H. L. Ramsay, H. L. Schultz, C. Stewart. Booth L-103.

Porterfield Mfg. Co., Los Angeles. Booth K-605.

Powermatic Ventilator Co., Cleveland. Industrial roof ventilators. Booth representatives, M. A. Thesmacher, L. M. Roskoph, J. E. Nylen. Booth E-610.

R. SCHUMANN
Precise Products Co.

Precise Products Co., Racine, Wis. Electric hand tools, flexible shaft attachment and other accessories. Booth representatives, H. W. Schumann, Robert Schumann, W. T. Walker, A. M. Seed. Booth A-309.

Precision Scientific Co., Chicago. Precision submerged specimen cut-off machine, automatic polishing machines and other laboratory equipment. Booth representatives, A. I. Newman, R. W. Bergen, E. D. Holt. Booth I-605.

Precision Shapes, Inc., Suffern, N. Y. Booth H-631.

D. C. ZIPP
Production Devices, Inc.

Production Devices, Inc., Whitehall, N. Y. Airlox air-operated vises and cylinders, hydraulically operated vises. Booth representatives, D. C. Zipp, W. T. Walker, A. M. Seed, C. L. Thompson and E. A. Davenport. Booth A-638.

P. V. BOLLERMAN
Pyrometer Instrument Co.

Pyrometer Instrument Co., New York. Optical, bi-optical, micro-optical, radiation, immersion, contact and surface pyrometers and indicators. Booth representatives, P. V. Bollerman, A. Bollerman. Booth P-517.

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Rack Engineering Co., Pittsburgh. Booth G-611.

Radio Corp. of America, Engineering Products Division, Camden, N. J. Electron microscope, evaporator unit, oscilloscope, vacuum gage and electronic dryers. Booth B-740.

R. WIGGER
M. Ransohoff, Inc.

Ransohoff, Inc., N., Cincinnati. Equipment for surface treatment of metals, including complete line of casting cleaning equipment. Booth representatives, R. C. Wigger, W. H. Berger, C. Brunn, H. E. Epley, A. A. Somers, J. J. Grobstein, B. Pervo, F. T. Mann, M. E. Robbins, W. M. Huber. Booth D-628.

J. M. CAGE
Raytheon Mfg. Co.

Raytheon Mfg. Co., Industrial Electronics Division, Waltham, Mass. Electronic equipment. Chief booth representative, J. M. Cage. Booth A-404.

Raybestos-Manhattan, Inc., Passaic, N. J. Booth A-605. (See Manhattan Rubber Mfg. Co.)

Radium Chemical Co., Inc., New York. Use of Radiographs in industry. Booth representatives, J. A. Kelly, R. G. Fordyce, G. T. Taylor, G. H. Loftus. Booth B-708.

Ransburg Co. Harper J., Indianapolis. Booth E-140.

A. R. SMITH
Ready-Power Co.

Ready-Power Co., Detroit. Gas-engine generator sets for electric trucks and other industrial needs. Booth representatives, A. R. Smith, G. W. Frampton, A. Huneck, R. W. Pelto. Booth D-746.

Reeves Pulley Co., Cleveland. Booth P-515.

G. E. ELLIS
Republic Drill & Tool Co.

Republic Drill & Tool Co., Chicago. High speed and carbon twist drills, including shankless and all-flute drills and the newly developed "Jet" drill. Booth representatives, G. E. Ellis, G. W. Anderson. Booth H-611.

Revere Copper & Brass, Inc., New York. Copper, brass, aluminum and magnesium shapes and tubing applications to various industrial fields. Booth B-306.

A. H. CHARLTON
Reynolds Metals Co.

Reynolds Metals Co., Louisville, Ky. Aluminum sheet and plate, shapes, castings, foil packaging, wire, rod, bar, tubing, finished formed shapes, forgings, pigment finishes. Booth representatives, D. P. Reynolds, R. B. Gray, J. E. Spike, Jr., A. H. Charlton, T. L. Fritzlen, P. Zeigler. Booth C-621.

Rhode Island Tool Co., Providence, R. I. Bright finish drop forgings, hot upset forgings ½ to 2 in. Booth representatives, L. W. Gallup, L. L. Allen, W. T. McKelvey. Booth A-738.

Riehle Testing Machine Division, American Machine & Metals, Inc., East Moline, Ill. Hydraulic universal testing machine, stress-strain recorder, impact testers and Vickers hardness testers. Booth representatives, C. E. Peterson, M. L. Millett. Booth E-604.

Roberts Rubber Co., Weldon. Booth C-738 (See Snyder, Almon, O.)

E. KING
Roebling's Sons Co., John A.

Roebling's Sons Co., John A., Trenton, N. J. Wire rope, fittings, slings, rolled strip, round and shaped wire, electrical wires and cables. Booth representatives, E. King, E. G. Hartmann, W. C. Palmer, F. J. Maple, W. E. Harvey. Booth D-720.

Rogers & Co., G. S., Chicago. Products for heat treating, metal working and industrial processing. Booth representatives, D. H. Henry, J. L. Pendleton. Booth A-707.

Rolock, Inc., Fairfield, Conn. Heat and corrosion resistant baskets, crates, trays and fixtures, and industrial wire cloth. Chief booth representative, F. B. Clarke. Booth B-739.

Ross Operating Valve Co., Detroit. Booth G-636.

R. W. DIETRICH
Rustless Iron & Steel Corp.

Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore. Stainless steel bars and wire, or technique for electropolishing stainless. Booth representatives, R. W. Dietrich, G. D. Moomaw, F. Buffo, P. B. Kline, S. P. Watkins, T. L. Moore, E. P. Geary. Booth C-102.

Ryman Engineering Co., Ellwood City, Pa. Booth A-622.

"S" Corrugated Quenched Gap Co. Booth K-609. (See Scientific Electric Div.)

G. VAN DYKE
Ryerson & Son, Inc., Jos. T.

Ryerson & Son, Inc., Joseph T., Chicago, Ill. A machining operation demonstrating Ryerson clean cut plates and data on alloy steels. Booth representatives, G. Van Dyke, J. Queen, Jr., C. C. Gobdel, H. H. Bowman, G. Voight. Booth B-134.

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Safety Clothing & Equipment Co., Cleveland. Booth G-611.

Salkover Metal Processing Co., Cleveland. Booth I-610.

Sapphire Products Div., Elgin National Watch Co., Aurora, Ill. Booth D-331. (See Elgin National Watch Co.)

Scherr Co., Inc., George, New York. Swiss-type automatic screw machine, gear testing equipment, projection equipment and inspection devices. Booth E-130.

F. L. ENGSTROM
Schrader's Son, A.

Schrader's Son, A., Brooklyn. Air cylinders and valves, speed control valves, air ejector sets, press safety controls, hydraulic gages, blow guns, pressure regulators. Booth representatives, F. L. Engstrom, J. Meister, T. R. Cottrell, A. S. Jorgensen. Booth I-628.

Sciaky Brothers, Chicago. Press and rocker arm types single phase spot welders, single phase portable machines, flash welders, and three phase spot welders. Booth B-605.

Scientific Electric Div., "S" Corrugated Quenched Gap Co., Garfield, N. J. High frequency heat induction furnaces. Booth representatives, J. J. Sedlacsik, H. Siegendorf. Booth K-609.

Seal-Peel, Inc., Detroit. Plastic coating. Booth representatives, M. E. Funk, G. Puddington, H. Graeber. A-618.

Sectional Brush Co., Cleveland. Industrial floor machines and vacuums. Booth representatives, R. M. Jones, T. E. Hunter. Booth B-604.

R. C. JORDAN
Selas Corp.

Selas Corp. of America, Philadelphia. Special combustion equipment and techniques in process heating, combustion to automatic production - line heat treating equipment. Booth representatives, F. O. Hess, J. Kniveton, J. A. Ehlinger, F. Maud, C. P. Mann, R. C. Jordan. Booth D-122.

Sentry Co., Foxboro, Mass. High steel hardening furnaces. Booth representatives, P. B. Crocker, G. Wheeler. Booth A-316.

Shakeproof, Inc. Booth B-324. (See Illinois Tool Works.)

Sheldon Co., E. H., Muskegon, Mich. Laboratory wall table with pressurized fume hood. Booth K-616.

Shell Oil Co., Inc., New York. Properties and application of Shell industrial petroleum products. Booth representatives, E. L. Bastian, C. E. Brown, W. H. Day, H. F. Wilmot. Booth B-714.

R. B. GOODY
Sherman & Co.

Sherman & Co., New York. Nu-Braze easy flowing silver brazing alloys and fluxes which become liquid at 480° F and at 800° F is water thin. Booth representatives, M. Sherman, R. B. Goody, C. B. Dearborn, Jr. Booth B-315.

Simonds Saw & Steel Co., Fitchburg, Mass. Power hack saw machines. Booth representatives, J. K. Fullerton, H. W. Gedman. Booth B-731.

Simonski, Gilbert S., Philadelphia. Booth C-754.

Simplex Engineering Co., Zanesville, Ohio. Radial hydraulic pumps and hydraulic closers for filter presses. Booth representatives, T. E. Raymond, W. Cole, D. B. Weir. Booth C-714.

V. H. ERICKSON
Snap-On Tools

Snap - on - Tools Corp., Kenosha, Wis. Wrenches and hand tools for industrial production and maintenance. Booth representatives, V. H. Erickson, D. Cook, George Walraven. Booth A-743.

Snyder, Almon O., Cleveland. Booth C-736 & D-737.

Socony Vacuum Oil Co., Inc., New York. Booth C-619.

Solventol Chemical Products, Inc., Detroit. Spray washing equipment, cleaner and rust preventatives. Booth representatives, G. W. Onksen, J. R. Ewing, K. O. Lenhard. Booth D-306.

C. L. MILLER
South Bend Lathe Works

South Bend Lathe Works, South Bend, Ind., Toolroom lathes, including bench types and precision turret lathes. Booth representatives F. C. Erhardt, C. L. Miller, P. M. Kennady, R. T. Kroll. Booth B-704.

A. C. KRACKLAUER
Sparkler Mfg. Co.

Sparkler Mfg. Co., Mundelein, Ill. Industrial and commercial filters, including plating solution filters and glass walled filters. Booth representatives, A. C. Kracklauer, W. J. Kracklauer, H. Corrodi. Booth A-721.

Specialty Equipment & Machinery Corp., New York. Sheet metal forming machinery. Booth representatives, M. Partiot, W. E. Pestalozzi, E. J. Reilly. Booth A-600.

Spencer Turbine Co., Hartford, Conn. Multi-stage turbo compressors. Booth representatives, R. A. Brackett, C. S. Gardiner, R. W. Richardson. Booth G-610.

Stainless Surface Hardening Co. Booth D-130. (See Industrial Steels, Inc.)

J. W. DICE
Sperry Products, Inc.

Sperry Products Inc., Hoboken, N. J. Supersonic testing and measuring equipment, including electric detector for tubing and bar stock. Booth representatives, J. W. Dice, C. E. Hohl, J. C. Smack. Booth G-601.

Standard Oil Co. (Ohio), Cleveland. Industrial petroleum products. Booth representatives, M. R. Bower, R. S. Scheidemantel, A. H. Turner, P. J. Finneran, H. H. Evans, J. J. Enginger, S. H. Davis. Booth B-609.

Standard Steel Spring Co., Coraopolis, Pa. Booth D-110.

Steel, Cleveland. A publication. Booth P-504.

Steel City Testing Laboratory. Booth B-720. (See Hydraulic Machinery, Inc.)

Steel-Parts Mfg. Co., Div. of Blackstone Mfg. Co., Chicago. Conveying equipment. Booth representatives, L. H. Klauer, E. Plett. Booth J-603.

Sterling Alloys, Inc., Woburn, Mass. Booth A-402.

Stevens Grease & Oil Co., Cleveland. Specialized lubricants for seam and spot welders. Booth representatives, C. W. Beck, A. R. Allison, A. S. Gressel, W. N. DeMuth, R. I. Patterson, F. J. Kohn. Booth C-622.

G. F. STALEY
Stoody Co.

Stoody Co., Whittier, Calif. Hard-facing rods and electrodes, manganese and high carbon electrodes, abrasion resistant castings and typical hard-facing applications. Booth representatives, G. F. Staley, F. L. Blodgett, H. W. Sharp, C. C. Hand, M. L. Johnson. Booth B-337.

Sun Oil Co., Philadelphia. Industrial petroleum products. Booth E-605.

Superdraulic Corp. Booth B-720. (See Hydraulic Machinery, Inc.)

Superior Electric Co., Bristol, Conn. Booth C-708.

F. J. SCHMITT
Stuart Oil Co.

Stuart Oil Co. Ltd., D. A., Chicago. Metal working and extreme pressure lubricants. Booth representatives, W. H. Oldacre, L. B. Perkins, F. J. Schmitt, J. E. McCoy, H. E. Erickson, S. C. Zylstra. Booth C-324.

Superior Flux Co., Cleveland. Welding, soldering and brazing fluxes, air hammers. Booth representatives, W. L. Ulmer, J. E. Terry, J. E. Thorne. Booth A-340.

Superior Mfg. Co. Booth A-340. (See Superior Flux Co.)

Sutton Engineering Co., Bellefonte, Pa. Seven-roll guideless tube and bar straightening machine, hardened and ground rolls and universal joints. Booth representatives, J. B. Sutton, O. J. Skawden. Booth F-605.

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Tabor Mfg. Co., Philadelphia. Booth A-605. (See Manhattan Rubber Mfg. Co.)

Tal's Prestal Bender, Inc., Milwaukee. Hand-operated and motor-driven portable pipe bending machine. Booth representatives, E. T. Tal, A. B. Doyle. Booth C-705.

Tate-Jones & Co., Inc., Pittsburgh. Booth I-616.

Tatra Tool Co., Cleveland. Booth A-626.

Tempil Corp., New York. Temperature indicating materials. Booth representatives, R. J. Pass, G. Wolten. Booth C-117.

Tennant Co., G. H., Minneapolis. Booth P-512.

Texas Co., Indianapolis, Ind. Industrial petroleum products. Booth representatives, F. M. Pobst, H. E. Nicholson, W. C. Lockwood, J. C. Van Gundy. Booth H-617.

Thermogen Corp., Cleveland. Thermogen gas applications. Booth representatives A. A. Grinnell, A. R. Houliston, W. R. Angell, Jr. Booth A-633.

Thom McAn Safety Shoe Div., Melville Shoe Corp., New York. Safety shoes. Booth K-621.

Tide Water Associated Oil Co., New York. Industrial petroleum products. Booth representatives, H. G. Mullen, A. R. Senftleben, F. C. Lempert. Booth D-324.

Timken Roller Bearing Co., Canton, Ohio. Booth P-518.

Tinnerman Products, Inc., Cleveland. Booth I-617.

Titanium Alloy Mfg. Co., Niagara Falls, N. Y. Metallurgical alloys, refractories, Zirconite sand, flours and washes. Booth representatives, W. G. Wellings, G. F. Comstock. Booth P-516.

Torit Mfg. Co., St. Paul, Minn. Dust collectors. Booth representatives, E. J. Girk, C. Sacco. Booth A-623.

Torrington Mfg. Co., Torrington, Conn. Torrington spring grinder, spring coiler, slitters, propeller fan blades and centrifugal blower wheels. Booth representatives, H. Nigro, J. M. Murray, A. C. Nigro. Booth B-606.

Towmotor Corp., Cleveland. Booth E-631.

Trends, Inc., Cleveland. Booth C-350.

Trent Co., Harold E., Philadelphia. Industrial furnaces. Booth representatives, H. E. Trent, E. F. Ewing, R. E. Brown, F. W. Fisch. Booth B-407.

Trent Tube Mfg. Co., East Troy, Wis. Welded tubing in stainless steels, monel, nickel and Inconel. Booth representatives, F. E. Elge, F. G. Flocke, W. R. Worboys. Booth B-750.

Trifari Krussman & Fishel, Inc., Providence, R. I. Precision castings. Booth representatives L. F. Krussman, R. A. Powell, F. M. Smith, P. L. Butler. Booth K-627.

Triplex Machine Tool Corp., New York. Booth B-400.

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Udylite Corp., Detroit. Plating barrel equipment, Handiplater, rheostat, Senior rectoplater, Junior rectoplater, filter, automatic hopper machine. Booth representatives, L. K. Lindahl, L. V. Nagle, A. J. Lupien. Booth C-720.

Ultra-Lap Machine Co., Detroit. Lapping machines. Booth representatives, N. Walker, H. W. Muellenhagen. Booth B-735.

Union Carbide & Carbon Corp., New York. Booth G-621.

United Chromium, Inc., New York. Metal finishing processes and products. Booth representatives, H. D. McLeese, R. H. Dudley, L. A. Critchfield, R. J. Wooley. Booth A-411.

U. S. Hoffman Machinery Corp., New York. Booth H-629.

United Welding Co., Middletown, Ohio. Booth 643.

E. F. ELLIOTT
Upton Electric Div.

Upton Electric Furnace Div. of Pattern Foundry & Machine Co., Detroit. Continuous and batch type electric salt bath furnaces for heat treating. Booth representatives, E. J. Rousseau, R. J. Rousseau, R. C. Upton, E. E. Cloutier, E. F. Elliott, F. K. Ziegler, L. Smith, R. C. Stewart. Booth P-519.

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Valvoline Oil Co., Cincinnati. Rust preventives, rust removers, cutting oils. Booth representatives, C. N. Rill, G. King, W. Boston. Booth A-621.

Vanadium Corp. of America, New York. Booth B-314.

Vapor Blast Mfg. Co., Milwaukee. Booth A-704. (See Lieser, G. H.)

J. C. McKENNA
Vanadium Alloys Steel Co.

Vanadium Alloys Steel Co., Latrobe, Pa. High speed steels, die steels for hot work and for cold work, chrome vanadium and carbon vanadium steels and special and carbon grade steels. Booth representatives, Dr. G. A. Roberts, J. P. Gill, R. B. George, J. C. McKenna, H. G. Johnstin, T. B. Blackwood, Dr. A. H. Grobe. Booth A-401.

• W •

Wall-Colmonoy Corp., Detroit. Colmonoy applications of fabrication. Booth representatives, A. F. Wall, L. V. LaRou, N. W. Cole, F. G. Jones. Booth C-746.

Webster Products Co., Cleveland. Honing machines. Booth representatives, F. H. Webster, G. I. Garapic. Booth A-753.

Welding Engineer, Chicago. A publication. Booth C-306.

Weldon Roberts Rubber Co., Newark. Soft rubber bonded abrasive implements. Booth representatives, G. Roberts, R. S. Henderson, L. M. Smith, A. O. Snyder. Booth C-736.

Wellman Bronze & Aluminum Co., Cleveland. Booth K-611.

Wellman Co., S. K., Cleveland. Clutch facings and brake linings. Booth representatives, S. K. Wellman, J. R. Nurney. Booth D-150.

Wells Mfg. Corp., Three Rivers, Mich. Booth A-731.

Wendt-Sonis Co., Hannibal, Mo. Carbide-tipped cutting tools. Booth representatives, M. Wendt, E. L. Hollenbeck, R. T. Spangle. Booth D-734.

Whistler & Sons, Inc., S. B., Buffalo, N. Y. Perforating equipment. Booth representatives, L. V. Whistler, S. A. Whistler, A. C. Jackson. Booth B-705.

Wickman Corp., Detroit. Resinoid bonded diamond wheels and steel bonded diamond wheels. Booth representatives, G. V. Patrick, B. M. Budds, S. R. Emig. Booth A-141.

Wilson Mechanical Instrument Co., Inc., New York. Hardness testing machines. Booth representatives, V. E. Lysaght, P. Fee, C. W. Smith. Booth C-142.

Wood Products Corp., J. R., Brooklyn. Precision castings. Booth representatives, R. L. Wood, W. I. Matthes. Booth B-747.

Work-Flow Equipment Co., Pittsburgh. Booth F-124.

Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y. Booth J-605.

• Y •

Yale & Towne Mfg. Co., Philadelphia. Booth A-414.

• Z •

Zagar Tool, Inc., Cleveland. Booth A-708.

German 110 MPH Turbine Locomotives

HEAVY allied bombings in 1943 forced abandonment of the construction of two streamlined turbine drive locomotives, designed to move a load of 400 tons at 110 mph, being built at the Krupp Works, Essen, Germany, an inspection by a T.I.I.C. team has revealed. The locomotives were so severely damaged that construction had to be abandoned.

The engines, of the 2-8-4 type, were designed to operate at 325 lb psi pressure and employed all steel boilers and all steel welded fire boxes. Driving wheels were 5 ft 9 in. in diameter.

Experimental work at the plant caused German engineers to feel that there is considerable promise in working pressures of around 350 lb psi, the report stated. It was further indicated that Krupp designers appear to favor diesels with mechanical drive, rather than diesel-electric combinations.

War time shortages of tin forced the German state railways to use a bearing metal with 10 pct tin content. Experience with bearings with this low tin content, especially in locomotives supplied to Norway, gave very satisfactory results and Krupp ultimately standardized on a white metal mixture of 10 pct tin, 15.5 pct antimony, 1 pct copper and 73.5 pct lead.

Another war time practice at Krupp was the construction of connecting and coupling rods of rolled steel I-sections, with the large and small ends forgings butt-welded to the rods. Failures with this type construction were reported to be very few. Sides of axle boxes in Krupp steam locomotives are fitted with a plastic guide of rag base, replacing previously used brass or white metal.

Driving axle boxes were of steel, with 5/64 in. white metal bearing surfaces. Scoring of the journal, in event of failure in the bearing material, was avoided by use of two brass strips inserted at 45° from the bearing center to take the load until new bearing metal could be installed.

New Milling Technique

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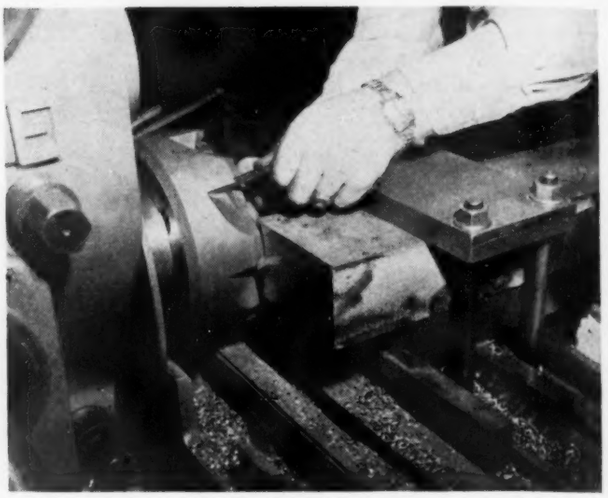


SETTING blades in a face Kennamill to the shoulder of a fly cut. The OD of all blades have a runout of 0.0005 in. max by this method, and surface finishes obtained are said to be superior to those obtained by grinding the cutter in a cutter grinder.

KNOWN as Kennamilling, an interesting new technique of face milling has been developed by Kennametal, Inc., in conjunction with a milling cutter of new design. This cutter features a precision built body with replaceable blades of solid Kennametal locked in place by precision wedges. Blades and wedges are completely interchangeable, eliminating the necessity for keeping these in any particular order when removing for grinding.

In a recent demonstration at the Wm. Sellers plant in Philadelphia, SAE 1040 steel bars were milled at the rate of 26 ipm, with a depth of cut of 0.125 in., on a 12-yr-old Brown & Sharpe knee-type mill, which would serve to indicate that conversion to carbide milling need not be held up for lack of new equipment. Armor plate was milled at a feed rate of 17 ipm, as compared with the best previous rate of ⅜ ipm, and Meehanite castings were machined at a feed of 50 ipm and a surface speed of 465 fpm, resulting in a stock removal of 100 cu in. per min, and a surface finish of 30 m in. profilometer reading.

A new grinding technique using a grinding block which incorporates all angles, both cutting and clearance, greatly facilitates the regrinding of the blades. All the blades in an 8-in. cutter may be removed, reground on a small bench-type surface grinder, and replaced ready for operation in about 25 min, or less than half the time commonly required with a standard cutter grinder. Moreover, this practice removes all possiblity of error, the human element, and the likelihood of damaging blades from excessive grinding as is only too possible in a cutter grinder, and at the same time insures the correct angles being ground at all times.

By leaving the cutter body on the spindle, dulled blades may be removed and replaced by freshly ground ones even in the middle of a cut, reducing the down time of the machine from hours to minutes, and leaving dimensional accuracy unchanged. To replace the blades, a single blade is inserted and the wedge tightened down with a torque wrench. The cutter is then brought into proper relationship with the workpiece, feed rate is reduced to correspond with a reasonable chip load for one tooth, and a fly cut is taken, which need only be sufficiently long to permit the operator to conveniently set the remaining blades. The remaining blades are then inserted one by one and permitted to rest gently against the shoulder of the fly cut, after which the wedges are tightened with the torque wrench. The peculiar advantage of this method, apart from the time saving, is the fact that it eliminates all inaccuracies in both the spindle and the arbor. Whatever runout exists in these machine members is compensated for by setting the cutter blades to the shoulder of a fly cut.

Dolomite Roof Gives 57 Heats in Arc Furnace

USE of 100-pct dolomite brick for the roof of a 4-ton electric furnace resulted in 57 heats under severe operating conditions before a shut down was necessary, according to a recent report of the Iron & Steel Institute, London, entitled "Dolomite Linings for Basic Electric Arc Furnaces."

The furnace, representing the first semi-stable dolomite (SSD) brick roof installation in Great Britain, operated on an 8-hr shift, coke being used between shifts to conserve heat.

In addition to the 9-in. roof, SSD brick was used in the side walls, charging and tapping door arches and jambs and the basic course under the hearth.

The report stressed that the refractoriness and resistance to fluxing at the hot face of the SSD brick was markedly superior to silica and it appeared that the dolomite brick could be run at a much higher temperature than silica without melting. When roof deterioriation brought the test to an end after 57 heats, the dolomite side walls were still in very good condition.

A recent survey of British users of SSD brick indicated that an average life of 70 to 80 heats was common under normal conditions in basic electric furnaces. One continuous furnace operator reported obtaining 95 to 100 heats with SSD side walls, as compared with 65 to 70 with magnesite. Chrome-magnesite gave about the same results as magnesite.

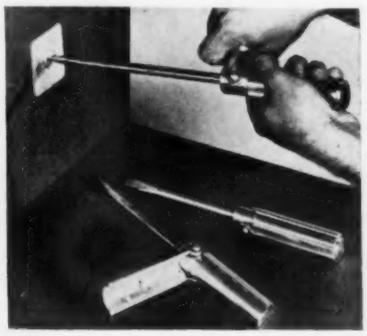
Chemical composition of the SSD brick runs as follows: 3 to 5 pct SiO_2, 0.2 pct TiO_2, 1 to 3 pct Al_2O_3, 1 to 3 pct Fe_2O_3, 0.1 pct Mn, 48 to 50 pct CaO and 38 to 40 pct MgO. Spalling index of the dolomite brick is 15, while the cold crushing strength is 4000 psi. Permeability is 0.2.

New Equipment . . .

Small Tools

. . . Various developments of general utility in all types of small tools including blind rivets, gage blocks, tool checkers, files, abrasive discs, soldering irons, tool holders, files & hones, screw drivers, expansion reamers and gaging heads are described in this week's digest of manufacturers' announcements.

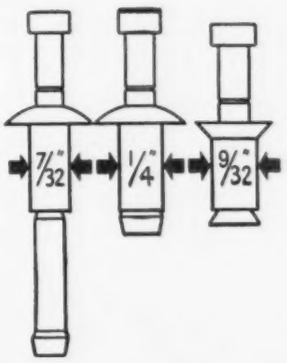
A HANDY tool for auto mechanics, maintenance men, assembly line workers, engineers, plumbers, carpenters, and others has been announced by *Behel & Waldie & Briggs*, 221 N. LaSalle St., Chicago 1. It is called Tuffy, a triple-purpose screw driver tool with a power-arm arrangement that is said to give extra power which unlocks rusted screws. In reverse, this tool is claimed to make possible the last quarter-turn pressure needed to tighten screws and make them stay-put, and with the power-arm folded



back into the handle, it becomes a standard type screw driver. This aluminum power-arm is said to be so constructed that when in use it affords a solid horizontal hand support that allows full hand and body pressure to prevent slipping or gashing of screw head. This tool has an aluminum handle, blade is drop-forged steel and plated to ward off rust.

Blind Rivets

TO meet the need for larger diam blind rivets, three new diam, 7/32 in., ¼ in. and 9/32 in. have been announced by the *Cherry Rivet Co.*, Los Angeles. These rivets are available in the three standard types, self-plugging, regular hollow and pull-through hollow, and in



modified brazier and 100° countersunk heads, and also in A17ST or 56S aluminum alloy, and in steel.

Gage Block

AN entirely different gage block has been announced by the *DoAll Co.*, Minneapolis. These lifetime gage blocks are said to provide three important advantages: (1) They greatly extend the use and application of gage blocks. (2) Wearing qualities are increased. (3) The average person can use these gages without difficulty. The advantages are made possible by the use of DoAlloy, a wear resistant alloy having expansion characteristics similar to steel. This gage block of wear resistant alloy is said to have the same coefficient of expansion as steel blocks. These high abrasive resistant gage blocks can be used under any temperature conditions whether in the shop, tool room or inspection department. Their stability is said to be unusual due to the unique heat treatment and the character of the alloy. They will remain flat under severe temperature changes and will retain their accuracies even though subjected to temperatures of 120° below zero to 500° above zero. They are acid resistant and will not discolor when subjected to many of the acids ordinarily encountered in production. These blocks can be used by the average man in the shop without lessening their life or impairing their accuracy.

Air-Speed Saw

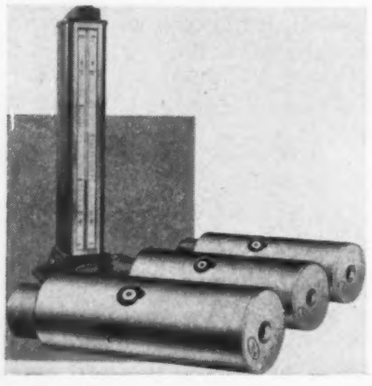
AN Air-Speed saw and filing tool driven by compressed air has been announced by the *Air-Speed Tool Co.*, 1028 W. Slauson Ave., Los Angeles 44. Designed to simplify and speed-up most sawing and filing operations, this tool is said to work advantageously in awkward or cramped quarters or from difficult positions. An adjustable barrel readily permits circular sawing in metals or woods, as well as difficult dead end, keyhole or scroll work. Balanced for ease of handling, and weighing only 3½ lb complete, this tool features finger tip speed and

power control, and a simple cutting stroke adjustment of from ¼ in. to 1¼ in. No gears, adaptors or power take-off devices are used in the con-

struction of this saw, and since only two internal operating parts are movable, long, reliable, trouble-free service is claimed.

Gaging Heads

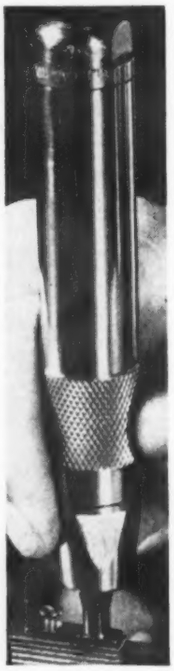
GAGING HEADS, identified as Class B, have been announced by *Federal Products Corp.*, 1144 Eddy St., Providence, and are for use with the Federal-Metricator Air Gaging System. For the present this applies to gaging heads from .240 in. to 2.510 in. diam. These gaging heads are said to provide the same accuracy as the higher priced gaging heads because of the fact that when gaging by air it is not necessary that the head or plug fit the gaged hole precisely as ordinary conventional plugs must. The diam of the plug acts primarily as a guide for centering it in the hole.



Their principal difference from the regular gaging head, is that they are not chrome-plated and lapped. They are hardened steel, fine-ground, and are said to have the same high degree of measuring accuracy as the higher priced gaging heads. Therefore, they should appeal to shops having short production runs or frequent changeovers where the higher priced gaging heads would prove too costly for the requirements.

Screw Driver

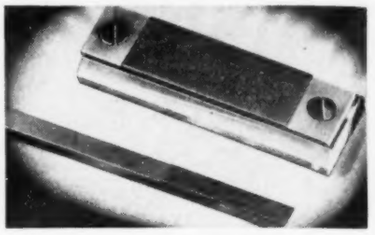
THE newest addition to the Aro line of pneumatic production tools is the Midget Pneumatic Screw Driver, Model 7000, announced by *The Aro Equipment Corp.*, Bryan, Ohio. This tool, said to be the first power screw driver designed especially for driving small screws, is about the size and shape of the average cigar. Its capacity includes screws from No. 1 to No. 6, and it weighs only 8 oz and is only 4⅞-in. long and ¾-in. in diam. It is fully automatic with no manual throttle, and starts automatically when tool



is applied to the work. In field tests by manufacturers of radios, cameras, electronic instruments and controls, electrical appliances and other products, this screw driver is claimed to have shortened assembly time and improved efficiency on operations where small screws or nuts are driven.

Files & Hones

A NEW line of Diamond R Files and Hones, for dressing carbide cutting tools without removing them from the machine, has been announced by *The Wendt-Sonis Co.*, Hannibal, Miss. These files and hones are said to contain a 100 concentration of diamonds in a new and exclusive metal bond. This bond enables both to maintain a flat surface throughout their service life. As a result, the tools sharpened do not become grooved, and also, this process allows these diamond impregnated files and hones to be used on high speed steels without loosening the diamond particles.



Expansion Reamer

THE newly designed Dual-Spiral Expansion Reamer, has been announced by *Lempco Products, Inc.*, Bedford, Ohio. The principal change in the new design is a solid one-piece body all the way from the driving end to the lower lock nut. This one-piece construction considerably reduces the number of component parts. In addition, because of its increased rigidity, the cutting blades spiral even more concentrically than previously, and runout is held to an absolute minimum, insuring accuracy to extremely close tolerances.

Tool Holder

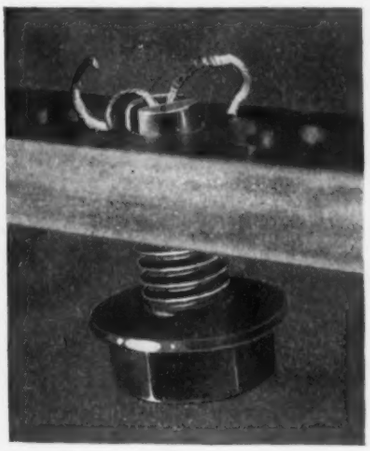
THE Model B Tool-Flex, a flexible tool holder that is said to float in oil resistant Neoprene, has been announced by *Burg Tool Mfg. Co.*, 6709 S. Pedro St., Los Angeles 3. It is claimed to be an ideal tool

holder for follow-up work on turrets of automatic or hand screw machines, engine lathes, drill presses, and larger multiple spindle screw

machines. It is self aligning, and tools are said to be always centered when tapping, reaming, honing, and counterboring.

Tap Screw

THE Holtite Tap Screw, which combines the actual cutting action of a tap with the economy of a screw, has been announced by *Continental Screw Co.*, New Bedford, Mass. Fundamentally the tap screw is a narrow fluted two-flute tap with the normal core of metal between the flutes cut out. This screw is not intended to replace the



sheet metal screw in normal applications, but it does, however, replace them in applications where harder materials, deeper holes, or the need for greater holding power and easier driving make sheet metal screws less satisfactory than desired. The screw can be used in applications where these factors have made it impossible to use sheet metal screws, which being harder than the material into which they are driven forcibly, displace the material by a cold forging action to form a mating thread. It is said that this screw cuts deep, smooth, clean threads in plastics without chipping the material around edge of hole, or bulging the hole perimeter upwards in the case of laminated plastics.

Grinding Fixtures

IMPROVED Ind-L-Way Drill Grinding Fixtures have been announced by *The Industrial Mfg. Co.*, 1900 Euclid Ave., Cleveland, and are available in two models. They are said to handle all sizes of drills from ¼ to 2⅞ in. in diam and up to 26-in. long. These fixtures are made for use with Black and Decker and Van Dorn bench and pedestal grinders or other makes of grinders having the same dimensions. The combination of one of these fixtures and the proper grinder is said to be as efficient as a more expensive grinding machine in the

precision grinding of points on all kinds of drills; for adjustments are provided for quickly securing the proper angle for every cut that is necessary.

Electric Soldering Iron

AN automatic-feed electric soldering iron, the Eject-O-Matic has been announced by the *Multi-Products Tool Co.*, 123 Sussex Ave., Newark, N. J. This iron is trigger operated and ejects a measured amount of solder from a reel concealed in the handle. A special retracting feature prevents the melting of excess solder on the heating tip. The iron is designed for all kinds of soldering work, and is especially useful in radio, plumbing, automobile, electrical, aviation and marine work. It is of special value to home craftsmen who have long felt the need for a safe, satisfactory, automatic-feed soldering iron. It is of balanced construction and compactly built. The pistol-grip

handle is made of molded bakelite, and the tool weighs 1 lb and a quarter loaded, and is said to be so perfectly balanced that it can be used for hr without fatigue.

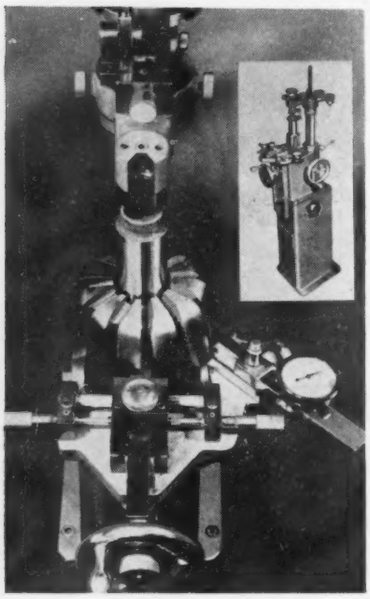
Micrometer

A NEW type of micrometer, which has the additional advantage of a dial indicator, has been announced by *Federal Products Corp.*, Providence. This instrument combines the accuracy, over the full one in. of the micrometer screw, and the precision of the dial indicator. It can also be used as a dial indicator comparator without the necessity of setting to a master; the micrometer feature fur-

nishes its own precision setting. The instrument is light, easy to handle and easy to read. The indicating dial itself is integral with the frame and is provided with tolerance hands, which can be easily set with the wrench furnished with the gage. When used as a comparator, the measuring spindle is locked positively in the desired position by a new type of thumb clamp which grips evenly, and does not throw the spindle to one side or out of line.

Tool Checker

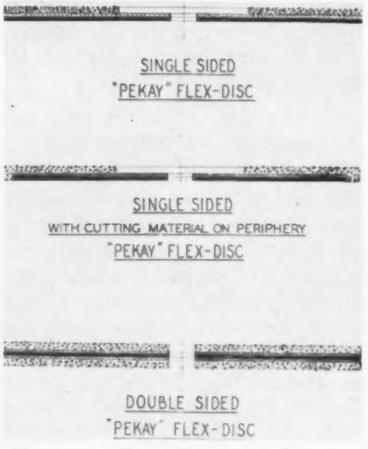
ORIGINALLY available exclusively for the checking of tooth spacing and hook or rake angles on thread milling cutters, this simple type of "hook checker" has been announced by *Detroit Tap & Tool Co.*, 8432 Butler Ave., Detroit 11, for universal checking of all types of form-relieved tools. Such form relieved tools can be



checked for sharpening accuracy on this universal tool checker, it is claimed, without the use of gage blocks, surface plates, Vee blocks, and indicator stands, for setting up different sizes and types of tools. It is thus adapted for use both in large centralized tool grinding departments and in small shops. Circular form tools, thread buttons, gear cutters, hobs, reamers, and form relived milling cutters are some of the cutters which can be checked.

Abrasive Disc

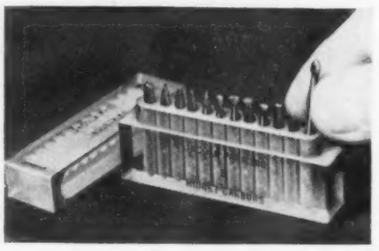
AN improved type of abrasive disk for metal-finishing for portable sanding units, has been announced by *The New York Grinding Wheel Corp.*, 623 Bergen St., Brooklyn. This disk is said to combine greater tensile strength, a wider range of compound mixtures and abrasives, augmented durability, and reduction in the number of operations. In addition, the Pekay Flex-Disk is available with the leading edge elevated, so that a thicker layer of cutting material is supplied at the point of max wear. Disks with grits on both sides for grinding in slots and grooves can be produced. Simultaneous roughing and finishing operations, in many cases, by a single disk of this new type



are reported. These improved abrasive disks are manufactured in any diam up to and including 18 in.

Files

ROTARY files of solid tungsten carbide in extremely small sizes have been announced by *Lincoln Park Industries*, Lincoln Park 25, Mich. These tools known as Midget Carburs are furnished in sets for tool room, die shop, pattern shop and general production use. The set consists of 12 tools in assorted shapes contained in a plastic case which provides a convenient method of keeping the tools in perfect condition. In application, they serve as a replacement for hand



files and mounted grinding wheels in innumerable operations requiring these tools. Their hardness is said to permit them to be used on practically any material, including hardened steel up to 65 Rockwell C. They will cut many times faster than grinding whels, being run at speeds from 65,000 to 100,000 rpm. Sharp corners, forms and radii can always be maintained. On softer materials the same advantages are apparent, and in addition their life is at least 50 times that of steel files.

Soldering Irons

AN improved line of industrial soldering irons has been announced by the *Industrial Heating Div., of the General Electric Co.*, Schenectady. Ranging from 75 to 300 w in size and available with tips from $\frac{3}{8}$ to $1\frac{1}{4}$ in. in diam, the irons are designed primarily for severe and exacting soldering operations in industrial plants where fast, continuous, high quality soldering is required. They are also said to be suitable for light, medium, and heavy intermittent soldering. An important feature of

these irons is their quick recovery and high reserve-heat capacity, which permits soldering as fast and continuously as the character of the work allows. Another feature is the use in these irons of calorized (surface-alloyed with aluminum) copper and 18-8 stainless steel for all parts subjected to high temperatures. This, it is claimed, together with the use of the well known Calrod heating unit, assures long life, uniform performance, low maintenance, and allows convenient renewal. Sturdily constructed, these irons are said to be well balanced and their plastic handles are cool and easy to grip, thus reducing operator fatigue and materially contributing to consistent production.

Drilling Attachment

A NEW six spindle, universally adjustable multiple spindle drilling attachment called the Multi-Drill has been announced by the *Commander Mfg. Co.*, 4225 W. Kinzie St., Chicago 20. This new attachment can be easily and quickly installed on most types of drill presses. It comprises a driving head with six movable spindles, each of which is located by an individual radially adjustable arm. This design readily permits the positioning of drills up to 17/64 in. diam in any hole pattern, including a straight line, within a 5-in. diam circle with minimum distance between centers of 11/16 in. From one to six holes can thus be drilled simultaneously in one stroke of the drill press.

. . . SEE REVERE AT THE METAL SHOW CLEVELAND, FEBRUARY 4-8

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Assembly Line . . .

STANLEY H. BRAMS

• Automobile output slumps as steel strike cuts parts suppliers of Ford . . . Bearings impair Packard . . . Lack of glass hits Chrysler divisions . . . Tool and die shops affected by auto union move aimed at GM.

DETROIT — Automobile production is beginning to slump once again. Although supplier strikes are not as widespread as they were a month or two ago, bottleneck shortages are cropping up, due mainly to the effect of the steel strike.

Ford Motor Co., largest producer of 1946 models to date, cut its operations drastically last week end and is further reducing them this week. Up to now final assembly lines have continued to operate, but manufacturing departments are going down one after another. Last Friday saw approximately 15,000 Ford Motor Co. employees in the Detroit area laid off, and an estimated 25,000 others are scheduled for layoffs this week.

Indicative of the difficulties in production are the reasons at the root of these layoffs. A week ago the schedule called for curtailment on account of glass shortages. However, settlement of the flat glass workers' strike a fortnight ago made it possible to juggle supplies on hand, in transit, and available because of the reopening of Libbey-Owens-Ford and Pittsburgh Plate Glass, to the extent that body manufacture could continue, even though the float of windows and windshields was being dragged to near-zero levels. By the time last week end came, when glass was originally supposed to cause a layoff, the glass situation had improved enough to permit current small output. But a whole series of brand new difficulties arose, largely due to the effect of the steel strike on suppliers.

For instance, rear axle housings from National Malleable were cut off. So were chain assemblies from American Chain & Cable. So were rivets, screws and bolts from Republic Steel, cotter pins from American Steel Co., crankshaft bearing caps from Pittsburgh Screw & Bolt, tubing from Bundy Tubing, even upholstery tacks from W. W. Cross & Co.

The strike of electrical workers at General Electric and Westinghouse has cut off the supply of production and service light bulbs. A tieup at Corn Products stymied shipments of core binder. Clutch facings from Johns Manville are likewise unavailable. This should present a fairly good indication of what automobile manufacturers are up against at this time.

Packard, meanwhile, shut down late last week due to a shortage of crankshaft and connecting rod bearings produced by the Moraine Products Div. of General Motors. This shortage came about two weeks after a resumption of work following a settlement of the Cleveland Graphite Bronze Co. strike, which had cut off shipments of bushings to Packard. As in the case of other supplier plant shutdowns effecting other companies as well as Packard, hopes are alive for location of another source, but none is immediately at hand. Packard is not troubled by either steel or glass shortages at this time.

DODGE, meanwhile, has gone down due to exhaustion of its supply of glass. Production in the DeSoto and Plymouth divisions has likewise been affected. This situation probably will be cleaned up by the middle of February, but in the meantime output within the corporation is drifting to very low levels.

Nash was forced down in January due to lack of further glass, and at the end of the month was

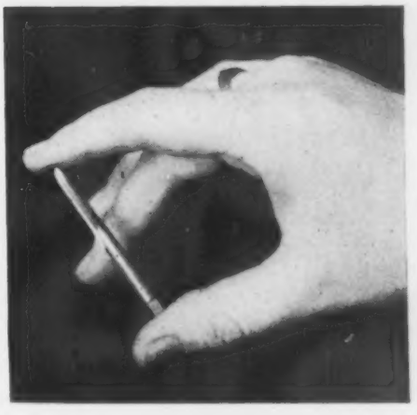
BIG MIKE: *The Ford Motor Co.'s training division makes use of this oversize micrometer, 20 times as large as the real thing, for class instruction. The classes are made up almost wholly of ex-G.I.'s.*

30-40% Longer Life in Pratt & Whitney Taps!

. . . proved by Thompson Aircraft Products Company of Cleveland, Ohio

Lower cost per tapped hole, trouble-free production, and 30-40% longer life with P&W taps than in any others they have used, according to the Thompson Company.

30 blind holes .390″ deep in these hydraulic couplings are being tapped to a class 3 fit at the Thompson Aircraft Products Company. Tap used is a Pratt & Whitney 3-Fluted 8-32 NC Plug Machine Screw Tap of High Speed Steel with Precision Ground Thread.



There is one unassailable proof of a product's quality — that is its record in actual use.

It is an unswerving Pratt & Whitney policy to spare no expense or effort to *guarantee* that every single tap shipped to a customer is the finest that can be made. Expert designing, highest grade steel, scientific heat treatment, and precision craftsmanship — all combine to give Pratt & Whitney taps their well-deserved record of top production efficiency. A listing of our complete tap sizes and styles will be supplied upon request.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT

still closed, although an early resumption was anticipated.

This left Studebaker, Hudson and Willys-Overland, as the sole producers, nowhere near presently contracted normal rates of output as January drew to its end. Complete paralysis, of course, continues over the farflung General Motors operations.

As a result of all this, estimates of 1946 car and truck volume are being rapidly revised downward. Originally they stood around the six million mark. Today, however, many confident observers believe the industry will be lucky if it gets half that number off during the 1946 calendar year; and the general belief is that the bulk of this production will come during the latter half of the year after a start has been made on 1947 models. In other words, there is no great hope for substantial assemblies through the balance of the 1946 model year, Ford being the only company which has maintained production even at the low levels typical of today's output.

THE precarious straits in which the industry finds itself is further complicated by a shadow whose length reaches all through 1946 and into 1947 — threats of strikes against the shops comprising the Automotive Tool & Die Manufacturers Assn.

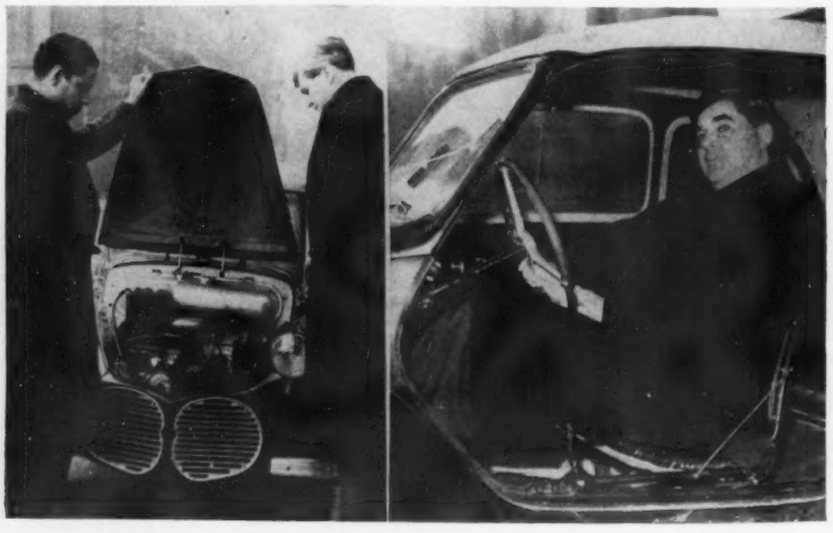
Work on General Motors orders in these shops was stopped last Monday by order of the CIO United Auto Workers union as a part of its strike strategy to intensify pressure on GM. In the main this resulted in a contraction of about 15 pct of work on hand and backlog in these shops, although a few of them were affected almost to the complete extent of their operations. At the same time some elements within UAW were pressing for a strike in the near future in all these plants, which would put a fairly effective choke on all 1947 tooling work, the bulk of which has been parceled out already or shortly will be.

The association has registered a vigorous protest with the auto union over the stoppage of work on GM orders. Some portions of the association's complaint are well worth recording here:

"We wish to point out that action of this sort makes a complete mockery of any contract arrangement we may have arrived at in the past or will arrive at in the future. . . . It means that at the union's will and desire any of our shops, or any of the work in them, can be stopped simply to fulfill strategy which does not involve our employers whatsoever. We fail to see where any security for us exists in any kind of an agreement drawn with you if we are to be the victims of secondary pressure on another employer, now or at any other time.

"This action is an obvious violation of your contract with us, which states that no strike action will be taken by the union unless and until the grievance procedure has been exhausted. In this case no grievance machinery has been set in motion. In fact, no grievance of any sort in our shops is involved in the work stoppage. This must be obvious to you, as well as the fact that the dispute which caused the stoppage is beyond our control."

ENGLAND'S NEWEST: *The "Kendall, a two cylinder, 6 hp, front engined, front-wheel-drive car, is in production at Grantham, England. Minister of Health A. Bevan is shown at the wheel of the automobile which sells for about* $500.



Plans to Step Up Sale Of Surplus Equipment

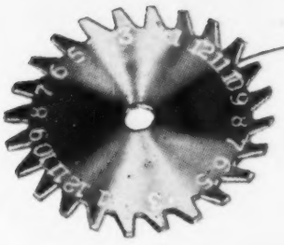
Detroit

• • • **A new plan for** sales of surplus war equipment through established machinery dealers is expected by the Detroit office of the War Assets Corp. to increase movement of surplus equipment quite considerably.

Agreements will be entered into by the corporation, which recently took over redistribution from the RFC, with established new or used machinery dealers and distributors as well as persons or other firms having necessary qualifications. Particular attention will be given to applications by veterans, it was stated, provided they have necessary engineering training, machinery sales experience and other qualifications.

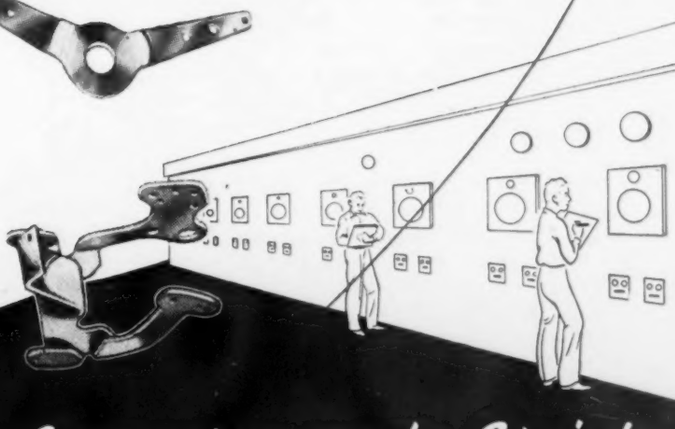
After investigation all applicants who are accepted are given the status of approved dealers and are allowed to process all details involved in the sale of government surplus machine tools and equipment, with the exception of final authorization of sale. All negotiations are reviewed and checked by War Assets Corp. before each sale is consummated.

Thus far, nine dealers have been appointed in Michigan, including the following: John D. Howarth & Co., 3135 E Jefferson, Detroit; Wm. Scott Machinery Co., 12641 Flanders, Detroit; Prussian Machinery Co., 1475 E Grand Blvd., Detroit; Walter F. Rooney, 1322 Horton Road, Jackson; Addy & Luby Machinery Co., 8316 Woodward Ave., Detroit; Bradley Machinery Co., 211 Joseph Campau, Detroit; Holzbaugh Machinery Sales, 10905 Charlevoix; Detroit; E. A. Krueger Co., 1010 Kirk St., Saginaw; Marquette Machinery Co., 18483 Greenlawn, Detroit.



It happened in

PRECISION INSTRUMENTS



When Carpenter made Stainless EASIER TO FABRICATE

One of the fields where Carpenter's development of uniform, easy-working Stainless Steels has contributed much in cutting rejects—lowering unit costs is precision instruments.

As an example of what we mean, look at these temperature control instrument parts. First, they must be precision-made to give accurate readings. Second, they must be long wearing to provide years of trouble-free service. Third, they must be corrosion resistant to keep functioning in the face of corrosive industrial fumes and dust.

All signs pointed to Stainless Steel. But ordinary Stainless wouldn't do. It had to be Stainless that would machine, blank and form easily and economically, lot after lot. Here's where Carpenter quality control really showed up.

Not only did Carpenter Stainless fill the bill on all counts, but *cut rejects in half.*

It just reaffirms a point we've been constantly stressing; you can do it better at lower cost with Carpenter Stainless. Keep this in mind when you plan your new or redesigned products. And remember: your nearby Carpenter representative can give you experienced help in selecting the right Stainless for the job. Call him in today or write us at the mill.

This handy Carpenter Stainless Steel Selector Slide Chart will help you quickly spot the right grade of Stainless to meet your requirements. It provides data on working properties, physical characteristics, etc., of each grade of Stainless. A note on your company letterhead, indicating your title, will bring you a Slide Chart, free.

THE CARPENTER STEEL CO., 121 W. BERN ST., READING, PA.

Carpenter STAINLESS STEELS

...for
- Strength
- Rigidity
- Heat Resistance
- Corrosion Resistance
- Longer Product Life
- Sales Appeal

BRANCHES AT
Chicago, Cincinnati, Cleveland, Detroit, Hartford, Indianapolis, New York, Philadelphia, Providence, St. Louis

Washington . . . .

L. W. MOFFETT

• Price control extension probable after hot fight . . . Second War Powers Act also likely given new lease on life . . . Carrybacks to stay . . . Wallace to stick as Sec'y of Commerce.

WASHINGTON—Present indications are that with reluctance and after heated debate Congress will extend the Price Control Act for a full year after June 30, 1946.

When President Truman in his recent message on the state of the union renewed an earlier recommendation for a year's extension of the act, he was well aware that there is a strong group in Congress that want to let the law die a natural death upon its present expiration date, June 30, 1946. He knew, too, that there is a smaller group, even more hostile, that would like to see it knocked off the statutes immediately. However, despite this opposition, the Administration apparently reckoned rightly that the prevailing sentiment of the country favors extension of the law, accepting the Administration's contention that that is necessary to prevent inflation.

Sound arguments have been made that OPA in administering the act has definitely failed in many respects to halt inflation. By the same token, contentions have been made that if price controls were lifted entirely, the meeting of supply and demand would come about sooner than it will under a system of government control. This argument for a return to a free economy is based on the point that with an ensuing upward swing in some prices they would reach a scale that would check buying, with a resultant decline in prices under the forces of competition that would level markets to a normal plane. Given adequate production, it is maintained that rather than being an easy philosophy of laissez faire this would be the inevitable result and actually would in many lines bring about increased output and lower prices, abolish the growing black markets and more quickly achieve reconversion.

But an outstanding popular view is that existing conditions are so chaotic that it will require a prolonged period before production can overcome shortages in basic materials and that until that is done prices must be held in check. The epidemic of strikes with the stifling of production obviously has given strength to this reasoning and undoubtedly has increased the prospects of extension of the price control law. Even some who charge that OPA's enforcement performance has been poor, and oftentimes foolish, are afraid that production, cut sharply by strikes such as in steel and other basic industries, will leave such a lasting effect that price control will have to be continued. They do not, however, pretend to estimate how much prices will go up either with or without price control. This uncertainty is created by the rise in wages which in itself has brought about increased costs of living. The problem can only be solved, it is realized, by increasing production and lowering costs, while maintaining a good wage standard. But at present the country is spinning fast in a reverse direction, headed toward an ever growing inflationary structure.

Extension of the Price Control Act, however, may be delayed until late spring and it may be granted a reprieve only after it has been considerably modified. One chief reason for the delay is the hostility of the Southern bloc in Congress which bitterly opposes a ceiling on cotton prices. Whether or not ceiling prices are fixed for cotton, this bloc apparently is determined to hold off such action as long as possible. Meantime it is said to be endeavoring to get a definite commitment from Mr. Bowles concerning the terms he is prepared to establish in the event prices on cotton are fixed. Dependent upon the terms, the Southern bloc is represented to be prepared to vote for or against extension of the law.

* * *

OTHER groups also are insisting on its modification before they will go along with the Administration, and OPA itself is clearly prepared to make changes. The character of some of them already has been disclosed.

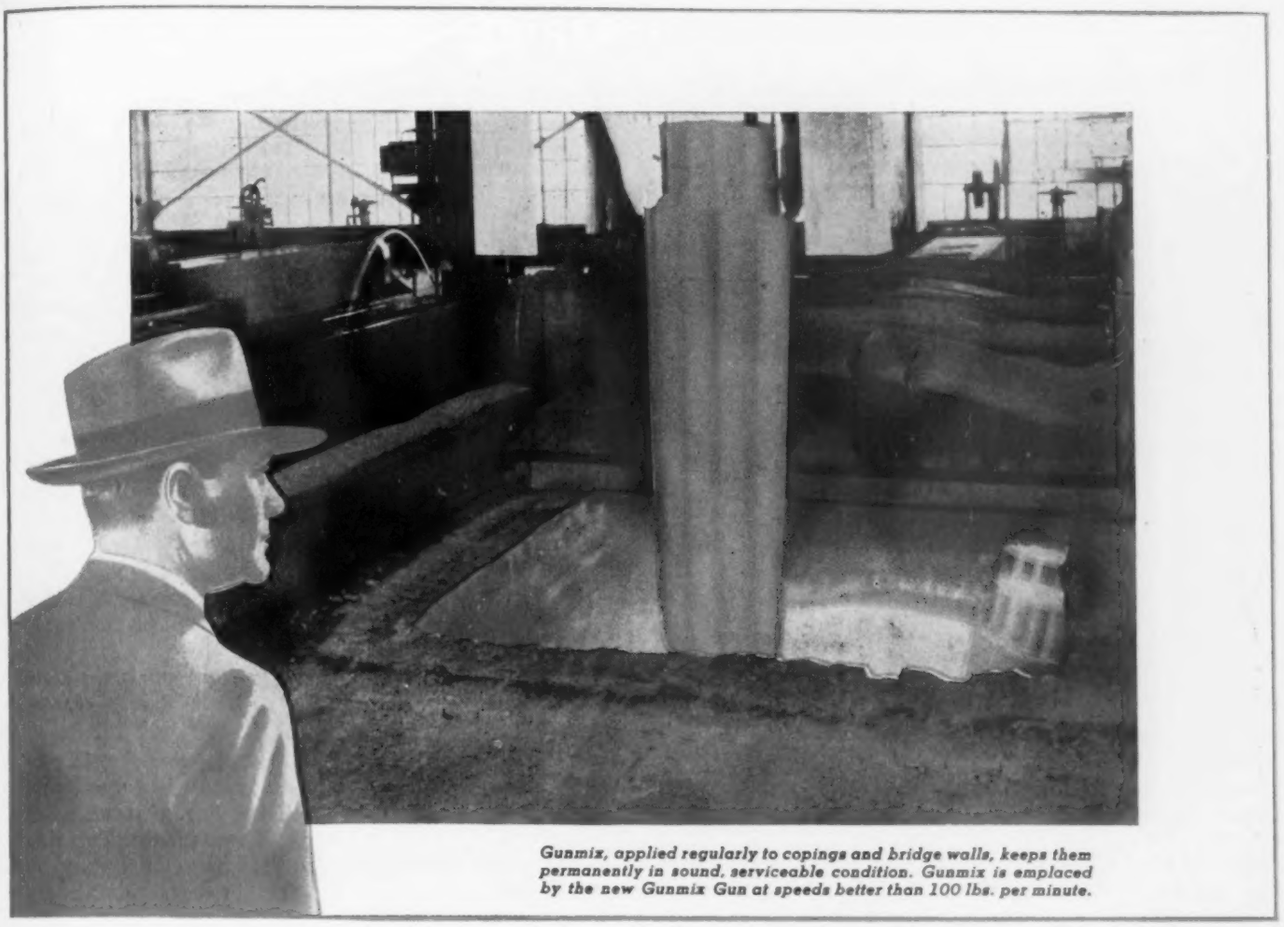
As OPA views the situation, Congress will either extend price control for a full year with considerable changes in the act or for a six-months' period with no substantial changes. Mr. Bowles would prefer the former. It is his belief that while price control in its present form will not be necessary for a full year beyond June 30, the additional months of grace will give OPA an opportunity to remove many controls, as production approaches normal levels, so that when the time comes for price control to pass from the American economic scene there will be few controls left, thereby lessening the shock on everyone concerned.

The OPA chief does not plan to fight for price controls on housing, unless forced to do so by the Administration. Faced with Congressional opposition, Mr. Bowles fears that a fight of this nature might possibly jeopardize present controls on building materials and contractors' services.

In general, it is not likely that OPA will ask for any major changes in the act, other than some improvements in administrative procedures.

While OPA's present policy requiring absorption of price increases by the distributive trades has been under constant attack on Capitol Hill, various committees report that they have been unable to unearth specific evidence of any real financial hardship being caused by cost absorption.

Congress will undoubtedly permit OPA to require cost absorp-



Gunmix, applied regularly to copings and bridge walls, keeps them permanently in sound, serviceable condition. Gunmix is emplaced by the new Gunmix Gun at speeds better than 100 lbs. per minute.

SAVE SHUTDOWNS OF SOAKING PITS

SOAKING PIT shutdowns can be avoided and pit life extended 30% or more by using Gunmix to maintain copings and bridge walls. That is the recent experience of operators who have the Gunmix Gun, which emplaces refractory by airstream and water.

Bridge walls are always difficult to repair because of the intense heat. The new Gunmix Gun, which can deliver 100 pounds or more of Gunmix per minute, on even a hard-to-get-at hot surface, is brought up close to the pit edge and in a few minutes restores breaks in the walls and seals all surfaces. This helps keep slag out of checkers and makes frequent shutdowns unnecessary.

Copings, likewise, are easy to keep sound and whole with the Gunmix Gun. Holes, cracks and crumbled edges which ordinarily interfere with proper seating of covers are kept in good repair by quick applications of Gunmix. The result is fewer collapsed covers, greatly reduced heat loss, and less frequent shutdowns for rebuilding, relining, etc.

The large new Gunmix Gun (Model No. 2) is available for trial. Write us, or ask the Basic representative about a demonstration in your plant.

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

tion, particularly since this principle has been upheld on several occasions by the Emergency Court of Appeals. However, there will probably be some attempts made to change the rules and provide new definite standards for cost absorption.

* * *

THE President also will likely get favorable action on his recommendation for further extension of the Second War Powers Act. *** Phil Murray will probably get nowhere with his drive, started through a letter to Secretary of the Treasury Vinson, for repeal of the Carryback provision of the tax laws.

Censures OPA Controls On Steel Warehouses

Detroit

• • • **Sharp criticism** of OPA price controls as they are applicable to steel warehouses was voiced by Federal Judge Ernest A. O'Brien when he recently ordered damages assessed against Star Steel Supply Co., 7520 Oakland Ave.

OPA had asked triple damages on a price control law violation involving $1,745.58 worth of steel. The steel in question was brought by trailer to the company warehouse. It rested on the trailer for a period, after which it was picked by a consumer without removal from the trailer. On the basis that warehouse companies are allowed higher prices only because of their customary procedure of storing and sorting, OPA entered suit.

Judge O'Brien allowed OPA and the government damages in the amount of the value of the steel, rather than triple that sum. He said: "I am frank to say I think this case should never have been brought to court. This was a hair's breadth violation of the regulation and if I thought I had the power, I certainly would dismiss the case." He went on to say that he had awarded the damages simply because he was compelled to and not because of his views of equity in the case.

Recommend Simplified Range of Steel Shapes

Washington

• • • **Effective Feb. 15,** a voluntary simplified practice recommendation for structural steel shapes has been approved for promulgation, according to an announcement by the Div. of Simplified Practice, Bureau of Standards.

Identified as R216-46, Hot-Rolled Carbon Steel Structural Shapes, the recommendation had its beginning in a proposal of the Technical Committee on Carbon Steel Plate and Structural Shapes of the American Iron & Steel Institute. The recommendation is composed of 19 tables and covers the nominal sizes and weights per linear foot of wide flange sections, light beams, stanchions, joists, standard beams, H-beams, wide flange bearing piles, channels and tees with angles shown in thicknesses. Sections and angles used in carbuilding and shipbuilding are also included.

The declared purpose of the program is to eliminate avoidable waste through identification of those varieties of structural steel shapes that have the greatest usage.

The recommendation will be available in printed form from the office of the Superintendent of Documents, Government Printing Office, Washington 25, early in February for 10¢ each. A discount of 25 pct will be granted on orders for 100 or more copies.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

OPRD Transferred To Dept. of Commerce

Washington

• • • **The CPA office** of Production Research & Development has been transferred to the Dept. of Commerce. Unliquidated war research and development contracts entered into by OPRD prior to the date of the order will not be transferred but will continue under the jurisdiction of CPA until liquidated, it was announced.

Transfer of OPRD was made in connection with the prospect of the creation of an Office of Technical Services in the Dept. of Commerce to afford scientific and technical assistance to industry, partiularly small business.

Senate Bill S-1248, recently introduced by Senator Fulbright, made provisions for such a service within the Commerce Dept. The bill proposes the assimilation of OPRD, the National Inventors Council and the technical advisory service of the Smaller War Plants Corp. within the Dept. of Commerce.

COMPLETE TEXT ON AIR GAGING

This 32-page book presents the WHAT-WHEN-WHY-HOW of the Sheffield Precisionaire—the air gage most universally used by the metal-working industry.

Write for this book. Learn of the advantages of the air flow principle which accounts for the instantaneous accuracy of the Precisionaire.

Look at the many illustrations of standard and special applications, both internal and external dimensions, where tolerances range from "five-tenths to five-millionths" of an inch.

Here is one booklet that will be useful to every tool engineering, designing, production, inspection, and purchasing key man who is interested in reducing production costs, yet maintaining equal or higher quality.

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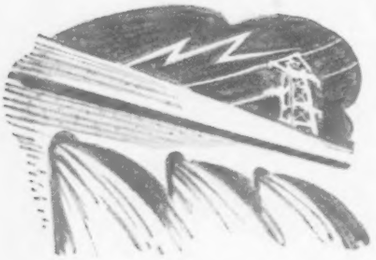
SHEFFIELD MASTER CRAFTSMEN

West Coast . . .

OSGOOD MURDOCK

• Scrap users fight to stave off eastward movement of choice material . . . Operation rate of Coast producers near 1,000,000 tons annually in spite of strike.



SAN FRANCISCO — Western users of iron and steel scrap are placed in the possibly embarrassing position of singing in chorus, "You don't miss the water 'till the well runs dry" as they appear before F. R. Linn, Interstate Commerce Commission examiner to protest the establishment of a $12.32 per gross ton rail freight on scrap steel plate and structural scrap steel from the Pacific Coast to the Chicago district (Group D as it is known in traffic vernacular).

This is the controversial rate established by the Interstate Commerce Commission at the request of Northwestern Steel & Wire Co. of Sterling, Ill., which was scheduled to become effective Dec. 22 but which was suspended by the I.C.C. on protest of Kaiser Co., Inc., and other western steel producers before the effective date.

At the hearing which opened here last Saturday and threatened to run well into the following week, the railroads which set the rate, certain scrap dealers which stand to profit and expend their markets and the Northwest Steel & Wire Co. which wants the scrap were put in the position of justifying the low rate. These "respondents" were opposed by the "protestants" which include the western steel companies which want to keep the scrap on the West Coast, and public bodies interested in their commercial welfare.

The battle centers over ultimate disposal of about 300,000 tons of unprepared Pacific Coast shipyard scrap which the local steelmakers insist should remain out here to prevent a scrap scarcity and which scrap dealers and midwest operators say is surplus and is sorely needed to keep furnaces operating in the Chicago area.

It is the contention of the respondent dealers that if this scrap is so badly needed out here, the bidding at recent offerings of large tonnages doesn't indicate it. William Shenker, representing his own Portland company and the Oregon chapter of the Scrap Iron & Steel Institute, testified that western steel producers bid from a high of $6 to a low of $2.25 a ton within the past several months on offerings of thousands of tons of the cherished material unprepared. He further stated that the high bidders were scrap dealers who now seek a market for their merchandise.

The freight rate existing for this scrap before the special rate was authorized was $14.78 a gross ton and John W. Bowman, secretary and director of purchases of the Northwestern Steel & Wire Co. testified that his company was so desperate for scrap on which to operate its electric furnaces that it had bought approximately 17,000 gross tons in November and that approximately 9600 gross tons had already been received with freight paid at this higher rate. Because of the suspension order no shipments have been made at the proposed lower rate. This means that Mr. Bowman's company paid from $22 to $24 a gross ton for delivered scrap according to testimony.

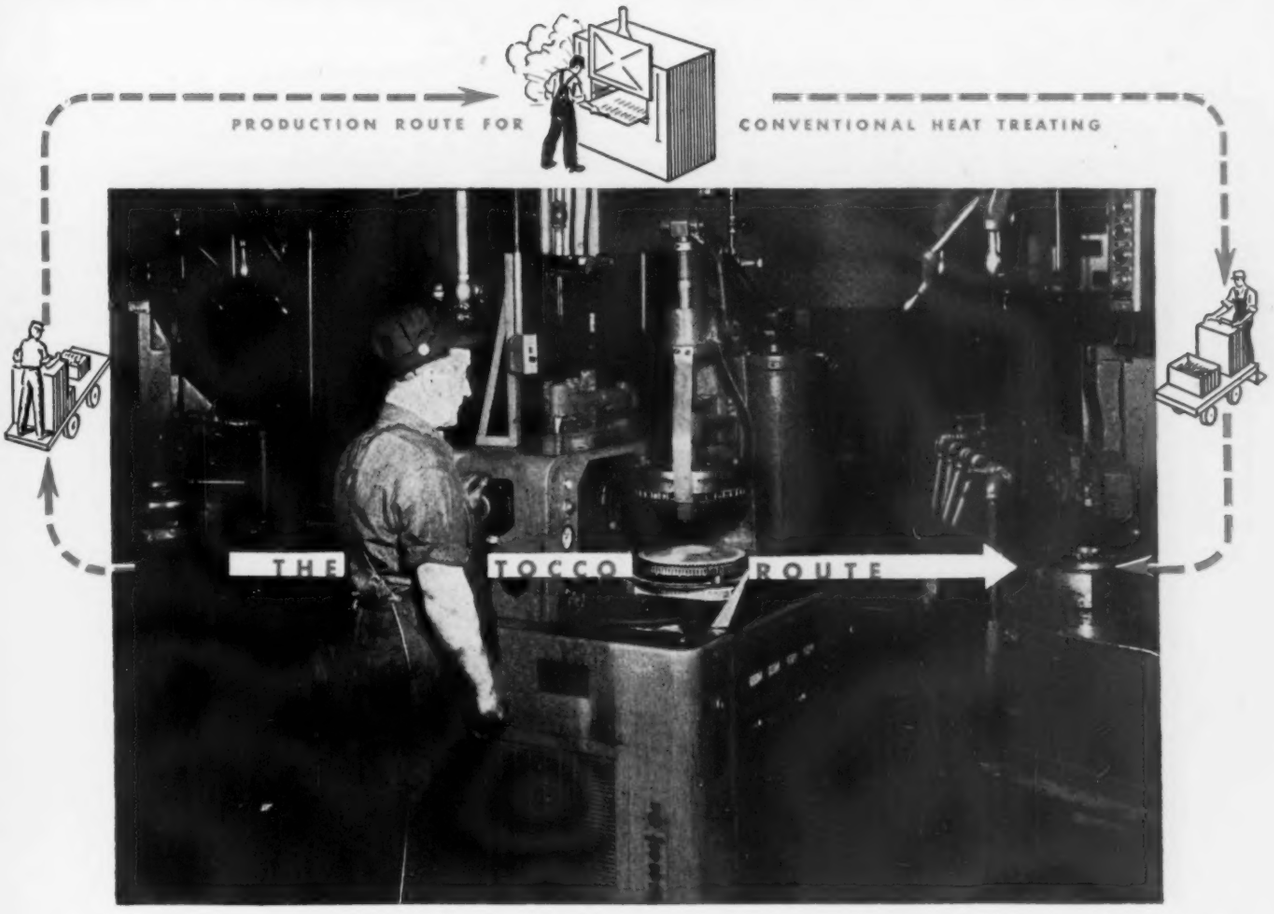
IT was Mr. Bowman's expressed opinion that if this western source could have been tapped during the proposed 120-day life of the low rate, a winter scrap famine in his area would have been averted and his plant could have operated profitably. He also stated that when more normal business activity sets in—possibly this spring—the junking of farm equipment, automobiles and other equipment would restore his normal scrap supply.

Mr. Bowman also testified that the fact that Kaiser Co., Inc. had been one of the companies offering the scrap for sale implied that this company was not interested in it for its steel plant at Fontana. However, T. K. McCarthy, representing Kaiser Co., Inc., pointed out, off the record, that it was the Vancouver shipyard operation of the company which operated under the Maritime Commission which made the offering of scrap. The steel division would be in the same position as any other possible scrap user on the bidding, he stated.

The affected railroads presented their case for the lower rate through several of their top-flight traffic men. F. A. Cleveland, freight agent for the Northern Pacific Railway; O. M. Anderson, assistant general N. P. freight agent; and A. J. Stilling of Union Pacific from Omaha represented that railroad and Pacific Coast lines. Testimony and exhibits presented by these men were intended to prove that the lower rate was not out of line with prevailing rates on other commodities moving West to East and that the low rate had been granted by them only after study by the standing rate committee of the Transcontinental Freight Bureau. It was pointed out that the first application for a lower rate to cover this scrap asked for a $10 rate which was denied.

The western steel producers took several opportunities to point out that the rate as set forth did not specify that the material shipped East was "for remelting purposes only" and the railroads' representatives indicated that the omission of that phrase had been an oversight and would be included in the new published tariff if the suspension was lifted. Protestants had pointed out previously that since the scrap was unprepared, much of it might well find its way into channels for resale and reuse.

Unbiased observers who have no axe to grind are a little puzzled by all the fuss over what appears to be a paltry $738,000 difference in freight even if all of the reported 300,000 tons of this choice scrap were shipped to the Midwest at the higher rate. However, it is apparent that eastern steel producers



WHY ISOLATE YOUR *HEAT TREATING?*

WILLYS-OVERLAND MOTORS, Inc., reports this time-saving idea in the manufacture of flywheel ring gear assemblies for the famous Jeep:

A compact, cool, clean TOCCO machine—used for shrink-fitting — is spotted between two automatic lathes which perform related operations. Conventional heating practice . . . cumbersome, hot and dirty . . . would have required isolation of the shrink-fitting operation and a costly production detour. The handy TOCCO set-up allows this efficient procedure:

The man shown in the picture machines one side of cast iron flywheel in machine at left . . . places it and ring gear in TOCCO work fixture . . . presses TOCCO start button.

The TOCCO machine automatically heats ring gear to 400°F. in 12 seconds, expanding its 12″ diameter .025″ . . . lowers ring gear and presses it on flywheel . . . quenches ring gear, cooling and shrink-fitting it to flywheel.

A second man removes the assembly from TOCCO and machines other side of flywheel in machine at right.

Since TOCCO almost operates itself, only two men are required for this three-machine set-up.

Find out how TOCCO can solve many of your production problems. The book, "Results with TOCCO," will be sent free on request.

THE OHIO CRANKSHAFT COMPANY • CLEVELAND 1, OHIO

TOCCO

INDUCTION

HARDENING . . BRAZING

ANNEALING . . HEATING

need scrap and there is a limit to what they can afford to pay—hence they want lower rates. It is equally apparent that western producers need scrap and even though they haven't bid high enough to keep this shipyard scrap at home, they don't want it to leave this area and create a tight market.

While the West is generally conceded to have been a scrap rich area before the war—even exporting large tonnages—expanded openhearth facilities and changes in practice may consume all postwar scrap available locally and demand still more, say some of the local operators. As an example it is pointed out that Kaiser Co., Inc. is now charging 65 pct scrap and 35 pct hot metal as against earlier practice which was just the reverse.

Final decision on the controversy rests with the I. C. C. which will make its decision after a study of the transcripts of the local proceedings.

Among those representing respondents at the hearing were: F. J. Melia, U. P. R. R.; Conrad Olson, N. P. R. R.; E. S. Grunstein, Dulien Steel Products Co. of California; Robert E. Quirk representing the N. W. S. & W. Co.; and P. N. Keen, Southern California Chapter of the Scrap Iron & Steel Institute. Protestants included: Frank Wicklund, Isaacson Iron Works, Seattle; Frank S. Clay, Portland & Seattle traffic assns.; R. L. Lamborn, A. P. Heiner and Gustave Loew, Kaiser Co., Inc.; Eugene A. Read, Oakland Chamber of Commerce; R. D. Sangster, Los Angeles Chamber of Commerce; Walter A. Rohde, San Francisco Chamber of Commerce; William C. McCulloch, Oregon Steel Mills and Electric Steel Foundry, Portland; O. K. Buckner, Electric Steel Foundry; A. M. Mears, Oregon Steel Mills; and Marion Newman, Pacific States Steel Corp., Niles, Calif.

* * *

LOS ANGELES — German uniformed, goose-stepping pickets; pickets from two unions on duty at the same plant; employers serving coffee and doughnuts to pickets; and other employers fraternizing with pickets; have added spice to the West Coast steel strike in spite of which steel is being produced at a rate of about 1,000,000 tons per year.

Locally both Bethlehem's and Columbia's openhearths are down, but the Kaiser Co., Inc. plant at Fontana is operating at capacity under the agreement granting the 18½¢ raise. Mr. Kaiser has stated that since the raise went into effect three production records have been broken. No statement was forthcoming from the company on what the raise meant in the way of increased costs, but on the basis of 2500 workers affected it would seem that the payroll should increase almost $80,000 a month or over $1 per ton, according to some of the men interested in the economics of steel production and in what effect this increase will have on costs which are reputedly already high.

In addition to the full annual capacity of 750,000 tons at Fontana, the Pacific States Steel Corp. at Niles is operating at the annual rate of 60,000 tons; Judson Steel Corp. in Oakland is free to produce its rated 76,000 tons annually; and the Oregon Steel Mills at Portland, Ore. is reported operating with a capacity of 60,000 tons. All of these plants have reached an agreement with the CIO.

Consolidated Steel Corp., Los Angeles fabricator, was favored with the presence of the German-uniform-attired picket who paraded with a placard reading "Injunction, Striking Forbidden, signed, 'Der Fuehrer.'" Apparently, the display was prompted by a Superior Court order which had instructed the union not to strike in violation of its contract.

This city now has approximately 16,000 to 20,000 persons idle because of strikes. Twelve thousand of these were made idle by the steel strike. Best estimates available indicate that potentially 64,000 workers may be affected if the strike is prolonged because of the materials shortages which will result.

Picketing since the steel strike was called has been peaceful and relations between employees and employers are not too unfriendly. The personnel manager of one of the struck aluminum plants has been serving coffee and doughnuts to the 25 or 30 pickets at his plant.

In Oakland all is quiet except for the roar of the small openhearths at Judson Steel Corp. and the battles which have become almost daily affairs between persons identified as sympathizers in the machinists' strike and those trying to go to work at the Bethlehem-Alameda Shipyard. Since the steel strike call it is not unusual to find pickets from both the machinists' and steel workers' unions doing duty side by side. As one employer expressed it, "This is the make-work theory put to the ultimate end."

Portland, Ore. is reported quiet and is apparently only slightly affected by the steel strike. The local steel users however are keeping their fingers crossed.

* * *

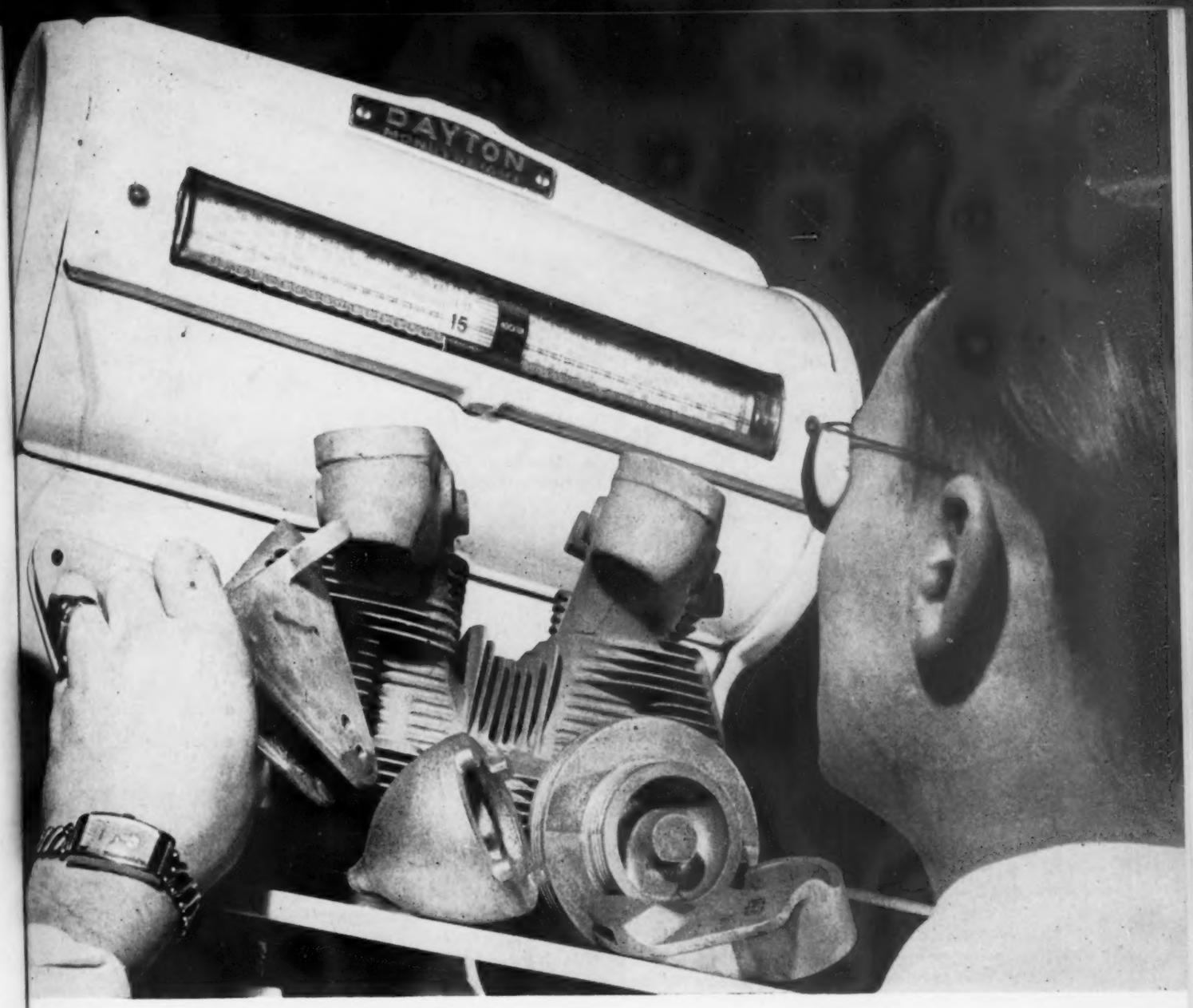
NEITHER Bethlehem nor Northwest Steel Rolling Mills, Inc., in Seattle, are operating nor are they attempting to negotiate, it is reported. No cars are moving into or out of the plants and all orders have been canceled. Picketing has been peaceful with supervisors and office workers passing the lines without trouble and even stopping to pass the time of day with the strikers. Picketing is not taken too seriously and one day last week the boys on the line at Northwest Steel Rolling Mills called it a day and went home when it started raining.

Isaacson Iron Works reports that it expects to keep going from 30 to 60 days without trouble and after that time will have to either shut down or use substitutes. The steel strike is less of a threat to them, it is stated, than is a brewing strike of machinists and blacksmiths.

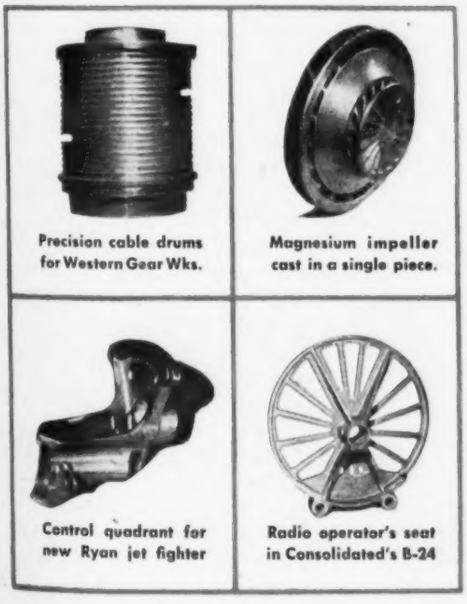
Pacific Car & Foundry Co. reports that it has as yet felt no effect of the steel strike. Much of their operations involve casting for which they have their own foundry. Their light metal operations face curtailment because of the sheet shortage and a machinists' and blacksmiths' strike wouldn't help any.

Hardest hit of any of the city's industries are the manufacturers of furnaces. It is reported that they will have to start laying off men this week because of material shortages. In the plumbing field wholesalers have been unable to meet demands for some time past and no improvement is in sight. There is little, if any, 2 in. or smaller galvanized pipe on the local market. Also hard hit are the sheet metal firms making drain pipe, pails and other similar products.

Shipyard and aircraft plant operations do not expect to feel any immediate effects of the steel strike because of the large inventories left when contract terminations came through.



You Can't Buy *Precision* by the Pound



Precision cable drums for Western Gear Wks.

Magnesium impeller cast in a single piece.

Control quadrant for new Ryan jet fighter

Radio operator's seat in Consolidated's B-24

WHEN YOU BUY CASTINGS, EXAMINE THEIR COST AT THE POINT OF ASSEMBLY

DURING the war, manufacturers learned that one of their costliest bottlenecks resulted from the job of converting rough castings into finished metal parts. Conventional rough castings, purchased by gross weight, incurred heavy machining costs, long delays in production, and complete waste of the material machined away.

Since 1942, the R. H. Osbrink Mfg. Co. has provided west coast aircraft manufacturers with their most reliable source for *precision* metal parts... parts which met all engineering specifications (achieving tolerances as fine as ± .005) in their original form. Precision castings made by the Osbrink Process . . . an original sand-casting technique for non-ferrous metals . . . have high-grade surfaces ready for use after minor touchup. Osbrink castings are sold by the casting, at a unit cost far below that of finished castings produced by conventional foundry methods. Let us show you how the Osbrink Process can solve your light metals production problem.

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European Letter . . . JACK R. HIGHT

• Nationalization programs proceed in Europe . . . First Labor Government rift appears in London . . . Polish industry to see complete public ownership.

LONDON—Reaction in the British conservative press has been violent following the attacks made by Mr. Herbert Morrison, Lord President of the Council (No. 2 man in the Labor Government) on the British steel industry, during speeches in Canada. Criticism here centered about the fact that the latest official word released to the British press has been that no final decision had been made on the nationalization, while Mr. Morrison has been quoted as stating unequivocally in Toronto that "nationalization will follow in due course."

The previous last word on the subject in Britain was to the effect that until a report in preparation by the industry itself on its modernization and rationalization plans had been submitted to the government, no decision would be made on the subject. It is considered in industrial circles here that the steel industry's program announced early last year must needs be the backbone of the report, and that actually little could be added to the scope of the plan as announced in light of present international trade conditions.

It it probable, however, that the report to the government will include many of the details of where construction is to be undertaken, and why, and exactly what plants are to be modernized. This will in effect be a process of filling in the details of the plan as previously announced.

Inasmuch as some of these details have already been announced to the public, while others are known to be ready for announcement, it is quite possible that the much discussed report has already been handed to the government. There are numerous reasons for not delaying the handling of such a crucial document, all of which are only too obvious to the industry leaders.

Government action following the submission of the report was not anticipated for a matter of weeks, and no official pronouncement was expected as a result until the spring. The present government, however, has already made a quiet name for itself in the way of nationalization surprises, particularly with regard to timing.

Mr. Morrison's unexpected statement opened the affair in Montreal, "We have decided to include in our economic planning for recovery the public ownership of certain basic industries." He continued that, "It is, I think, pretty hard-headed and sound common sense. Some of these industries such as coal, iron and steel, and transport are in pretty bad shape. They are definitely a drag on other industries and hamper the efficiency and enterprise of trades and industries to which we look for rapid, bold and private development. They were not even making a sound margin of profit."

Despite the immediate howl of criticism that went up in the United Kingdom press following the above statement, Mr. Morrison proceeded with another and more positive blast two days later in Toronto that would appear to close the issue. Certainly no form of modification or retraction of the statement has been made either by Mr. Morrison himself or by the government here.

In a later speech in Toronto Mr. Morrison touched upon the compromises with the traditional concept of public ownership that are being considered as the decisions on nationalization are made. He pointed out that the options which might be worked out for an industry included free competitive competition, under private enterprise; or free monopoly private enterprise; or controlled and supervised monopoly enterprise; or by public enterprise of one sort or another.

He explained that the industries which were to be nationalized would not be run by civil servants, but by public corporations, and confirmed predictions that the coal nationalization bill now before Parliament would be the basic pattern for future legislation.

While Mr. Morrison was involving himself in New World explanations of British policies there arose on the home front in his absence the first signs of a rift in the labor cabinet. The abrupt resignation of the No. 2 man in the Board of Trade, who was the parliamentary secretary to Sir Stafford Cripps, was attributed to major disagreements in policy. According to the speech of explanation which the former Cripps assistant Mr. Ellis-Smith made to his constituency, the disagreement included among other things a wide variance of viewpoint on nationalization, surplus disposal and the increasingly distasteful austerity living in Britain.

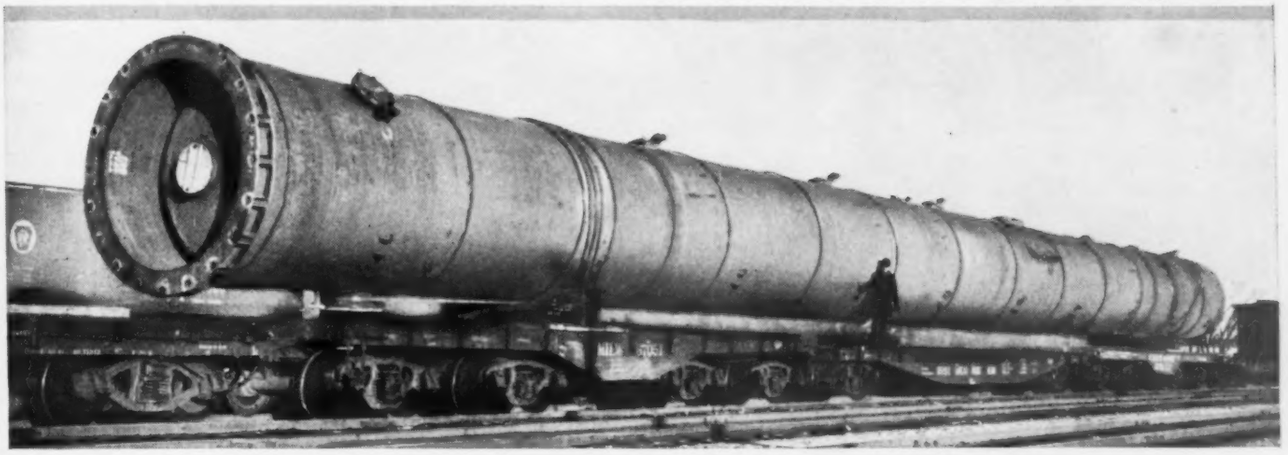
* * *

PROGRESS of French efforts to nationalize basic industries is becoming more difficult due to the rapid decline in prestige of the present cabinet, brought about largely by the still serious food situation. Other factors have proved almost as disheartening to the average Frenchman. The nationalization of principal banks, which was the first step in the road to public ownership was heralded with predictions of a brighter industrial future. Today, however, the banks are being managed by the same people that were running them in private hands, due principally to a com-

1925

The first SMITHway pressure vessel established an electric arc-welded construction that overcame the most serious industrial hazards ever known in the petroleum industry.

In 1925, *the First* . . . In 1946, *the Largest*



1946

Twenty-one more years of unending welding research, makes possible today this single-piece 160-foot 446,000-lb. deisobutanizing tower; a SMITHway vessel which produces 652,000 gallons per day of butane.

ACTUAL shop production has proved SMITHway Certified Welding Electrodes from the day they were first developed. A. O. Smith plants use more than 320,000 a day; millions more are used by other manufacturers.

This wealth of production and application experience has been paralleled by continuous welding research in A. O. Smith laboratories. Each year since 1917 has seen the development of improved SMITHway Electrodes. Each year has seen these electrodes employed by A. O. Smith to pioneer the welding of every type of steel product . . . small, simple products no less than structures weighing up to half a million pounds.

Everywhere farsighted management is studying how welding—the modern production tool—*improves quality,* cuts cost, simplifies production.

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HOUSTON 2 • DALLAS 1 • LOS ANGELES 14 • SEATTLE 1
INTERNATIONAL DIVISION: MILWAUKEE 1 • *In Canada:* JOHN INGLIS CO., LIMITED

FROM WAR TO PEACE: *Propellers from the RAF's bomber and fighter aircraft, melted down for conversion into saucepans, have now reached the last stage of assembly operation. They are also used for window frames and other articles of importance to the home.*

plete lack of anyone qualified to take their places.

There is a dubious note in present discussions of wider public ownership plans due to a fear of the same situation recurring. The whole subject of selecting suitable personnel is as trying in the postwar France as any other single problem. Whether it is the government attempting to fill an important administrative post, or an industry faced with a replacement of a key executive, there seems always to be a serious dilemma.

When everyone who is suspected of having dealt with Germany or the Vichy regime is weeded out, and the opportunists who are anxious to get some affiliation with the resistance movement on their record are eliminated, the remaining group are too often either from the old guard leaders of the early thirties, who are considered by the government to be tainted with failure, or young resistance leaders who are considered by the older leaders to be greenhorns.

* * *

In Czechoslovakia "middle-of-the-road" elements in the provisional government are making serious efforts to reduce the broad scope of nationalization which was established as the policy while the government was still in London. Although action taken thus far has been of a minor nature, the slight reaction is said to be a result of the setback of the Communist party in the Austrian elections, and is strong enough that some political observers see the Communists in Czechoslovakia as desiring a postponement of coming elections.

* * *

Legislation has now been approved in Poland which will nationalize industry in that country. The measures will become effective this month. The Polish government is taking active steps to get her industry into operation, and has made commitments for the shipment of coal to both Sweden and Czechoslovakia, as well as for a gift of coal for relief purposes in Europe.

These agreements are largely dependent upon the reconstruction of some means of transport in Poland. Hundreds of thousands of tons of coal are known to be waiting for shipments on the surface at Polish mines. UNRRA is taking a hand in the transport problem for Poland as well as for other countries, and both rail equipment and trucks are being delivered.

Polish troops which have served in the British Army during the war are now being used to drive trucks from U. S. Army depots near Marseilles, France, to Poland. A shortage of G.I. drivers had delayed earlier deliveries.

•

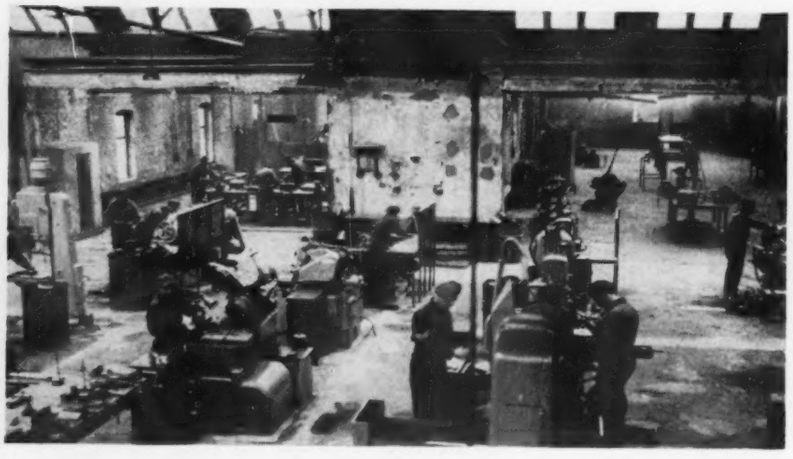
Retires From British Assn.

London

• • • **E. C. Evans,** who for many years has been associated with iron and steel research in Great Britain, has retired from the British Iron & Steel Research Assn. That organization has now been succeeded by an autonomous research group, which Mr. Evans helped to form.

Until recently Mr. Evans was technical secretary to the Iron & Steel Industrial Research Council, which functioned primarily as a committee of the Iron & Steel Federation. His retirement was deferred until the new research group head, Sir Charles Goodeve, could assume his duties with the organization.

REFRESHER COURSES: *General view of the engineering shop at the Guards Division college at Bonn University, Teachers College, Germany, where only soldiers of this Division are offered courses in 14 different trades.*



No "WOBBLE-WORRIES" with Corbin-Phillips Screws

Anybody who has driven ordinary slotted screws with a power driver knows the "*wobble worries*" — a persistent fear that the driver will slip and mar the work. Wobble Worries slow production, cause fatigue and irritation.

There are no Wobble Worries when you furnish Corbin-Phillips Screws, because the hardened steel driving bit is held firmly in the Phillips Recessed Head, surrounded and *centered* in a firm grip that insures *straight-line driving*. Production increases, fatigue decreases . . . profits show up.

Add Corbin uniformity, and you have one answer to higher wages with lower selling prices.

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CORBIN PHILLIPS Screws

PERSONALS

° ° °

• **J. H. Patton** has been appointed manager of the Electric Welded Tubing Div. in charge of sales and operations of Brainard Steel Corp., Warren, Ohio. **Charles E. Nail,** formerly of Ohio Seamless Tube Co., has become associated with the Tube Div. of the company. **Lester J. Lyons,** formerly eastern sales manager, New York City, has been appointed manager of sales of the Strapping Div., and **J. C. McGunnigal,** who has been in the Navy, has returned to the company and has been appointed sales manager of the Strip Steel Div.

• **Dr. W. H. Avery,** physical chemist, formerly with the Allegany Ballistics Laboratory, has joined the staff of Arthur D. Little, Inc., Cambridge Mass. **Dr. Richard Handrick,** organic chemist, who was at the University of Pennsylvania, and **Winslow A. Sawyer,** mechanical engineer with the Army ordnance dept., **Raymond M. Hainer,** physical chemist at Brown University, and **Richard F. Messing,** chemical engineer, formerly serving with the Office of Scientific Research and Development, all war research workers, have also joined the company.

• **Omer W. Blodgett** has been appointed welding engineer for the Grand Rapids, Mich. area of Lincoln Electric Co., Cleveland. During the past 4 yr he was welding superintendent for the Globe Shipbuilding Co., Superior, Wis. **Frank Boucher** has been appointed welding engineer in the Detroit area. He worked in Lincoln Electric's service and sales depts. for nearly 6 yr prior to his recent appointment. **R. K. Kewley** has been appointed welding engineer in the Cleveland territory. **G. B. Moseley,** welding engineer in the St. Louis area, and **Capt. L. J. Cogan,** recently released from the Army, has returned to his duties as welding engineer in the Philadelphia area.

• **E. H. Hoerres** has been appointed resident manager of sales of the Jones & Laughlin Steel Corp. in Milwaukee. Prior to his present appointment, he was associated with the company's Chicago and Detroit sales offices as a salesman. He succeeds **Milton G. Englert** who has been transferred to the J & L district sales office in New York.

• **George M. Rigg** has been appointed manager of the Weirton Coal Co., Weirton, W. Va., in charge of operations, effective Feb. 1. He has been assistant manager of the company for the past several years. Mr. Rigg will succeed **S. M. Cassidy** who will leave Weirton Coal Co. to take a new position with Consolidation Coal Co.

• **A. C. Castle,** vice-chairman of A. M. Castle & Co., Chicago, has resigned from active duty, but will remain as a director of the company.

• **Herbert F. Weaver** has been appointed production manager of Monsanto Chemical Co.'s Phosphate Div., succeeding **Edward A. O'Neal, Jr. J. Fred Reeves,** formerly assistant plant manager, will succeed Mr. Weaver as manager of Monsanto's plant at Anniston, Ala.

• **A. VanderZee,** vice-president in charge of sales of Chrysler Corp., Detront, has been elected to the board of directors.

• **Don G. Mitchell** has been elected executive vice-president of Sylvania Electric Products, Inc., Ipswich, Mass. Mr. Mitchell joined Sylvania as vice-president in charge of sales in 1942.

DON G. MITCHELL, executive vice-president, Sylvania Electric Products, Inc.

• **Roland A. Sherwood** has been appointed assistant to the president of American Locomotive Co., New York. He joined the locomotive company in 1939 and became assistant to the executive vice-president last September.

• **Sidney J. Steele** has resigned as vice-chairman of the board of directors and as a member of the executive committee of Continental Can Co., New York. He will continue as a member of the board and will be available to the officers for consultation and advice.

• **W. A. Gray, Jr.** has been appointed sales representative for the Scullin Steel Co., with headquarters in St. Louis.

• **C. W. Ginter,** who has been associated with the Aro Equipment Corp., Bryan, Ohio, since its organization 16 yr ago, has been appointed vice-president of the corporation. His duties will be to further the development of all pneumatic tools and lubricating equipment, the handling of all patents, the approval of all purchases of new machinery, and the construction and changes of all buildings.

• **E. E. Eyman** has been appointed manager of marine sales for National Malleable & Steel Castings Co., with headquarters in Cleveland. Mr. Eyman joined the company in 1917, became sales agent at the Cleveland Works in 1922 and in 1931 was transferred to the general office in charge of chain sales.

• **C. L. Hardy** has been appointed manager of the Philadelphia steel-service plant of Joseph T. Ryerson & Son, Inc., succeeding James M. Mead.

• **Victor Malcolm** has been appointed Republic Steel Corp.'s representative in the United Kingdom, as well as general manager of their interests in Western Europe. He succeeds the late **W. E. Knight.** Mr. Malsolm served with Dorman Long & Co., Ltd., until 1935, when he became secretary of the British Iron and Steel Federation. He has during the war been on loan from the British Iron & Steel Corp., Ltd., to the Iron and Steel Control of the Ministry of Supply.

• **Maxwell A. Goodwin** has returned to his prewar position as manager of the Chicago office of Clark Tructractor, division of Clark Equipment Co.

• **Charles G. Boone,** superintendent of the Pennsylvania Salt Mfg. Co. plant, Natrona, Pa., has retired after 21 yr as head of Pennsalt's Natrona operations.

• **Dr. H. S. Sutherland** has been appointed general sales manager of Shawinigan Chemicals Ltd., Montreal. Dr. Sutherland joined Shawinigan Chemicals Ltd. in 1931 and was loaned as manager to St. Maurice Chemicals Ltd., a company established during the war to manufacture the new high explosive, R.D.X. **C. K. Lockwood** has been appointed sales manager, Stainless Steel & Alloys Div. of the company.

• **Joseph P. Argyle,** vice-president and director of Vierling Steel Works, has retired after 56 yr of continuous service with the company. He has been associated with the erection of many important Chicago buildings, and middle-western power stations, highway and railroad bridges. He was elected vice-president and director in 1929.

• **Sterling T. Boyd** has been appointed plant metallurgist of the Colonial Steel Div. of the Vanadium-Alloys Steel Co., located in Monaca, Pa. Previously, Mr. Boyd was employed as chief inspector of the same company.

• **Arthur D. Beers,** formerly assistant superintendent, central mills, Gary works, Carnegie-Illinois Steel Corp., has been appointed superintendent succeeding **J. C. Wilkins,** retired. He has been associated with the plant since 1911, when he started as a chemist. **David L. Simpson,** formerly assistant chief metallurgist of the plant, has been made superintendent of the 12-1 and 12-2 merchant mills, succeeding **William Lange,** resigned. He joined the company as a metallurgical observer in 1935. **Lester R. Pearson,** associated with the plant since 1917 and formerly assistant to superintendent of the Gary works roll shop, has been made superintendent, succeeding **Robert S. McCleery,** retired.

H. E. REPLOGLE, manager of tool steel sales development, Universal-Cyclops Steel Corp.

• **H. E. Replogle** has been appointed manager of tool steel sales development of Universal-Cyclops Steel Corp., Bridgeville, Pa. Mr. Replogle has been with the corporation for several years in a sales and service capacity.

• **Russell Hunt,** vice-president in charge of sales, Sloss-Sheffield Steel & Iron Co., Birmingham, will retire Feb. 1. Mr. Hunt was employed by Sloss-Sheffield in 1898 and his first job with the company was as an office boy-clerk in the treasurer's office.

• **J. Melvern Benjamin** has been appointed sales representative for Eastern Pennsylvania, Southern New Jersey and Delaware for the McInnes Steel Co. of Corry, Pa., covering their line of tool steels and forgings. **Paul B. Allen** has been appointed sales representative for the Detroit district for the company.

• **Bernhart Troxler,** smokeless powder production adviser for Hercules Powder Co., Wilmington, Del., has retired.

• **Milton P. Higgins** has been made president of the Norton Co., Worcester, Mass., to succeed **George N. Jeppson,** who becomes president of the board succeeding **A. C. Higgins.** The latter becomes chairman of the executive committee. **William J. Magee,** assistant treasurer for 5 yr, has been made treasurer and a director of the company.

• **James D. Mooney,** who recently resigned as a vice-president and director of General Motors Corp., has been named president and chairman of the board of Willys-Overland Motors, Inc., Toledo. **Ward M. Canaday,** previously board chairman, has been elected chairman of the company finance committee. **Charles E. Sorensen,** president since early 1944, has been made vice-chairman of the board.

• **Mark V. Keeler,** former works manager of the wartime St. Paul, Minn., gun plant of International Harvester Co., has been appointed works manager of the company's recently acquired Evansville, Ind. plant, which will manufacture refrigeration equipment. Other officials at Evansville will be **W. F. Borgerd,** manager of engineering; **C. A. Olson,** divisional comptroller; **C. D. Harris,** manager of manufacturing; and **Richard Siegel,** industrial relations manager.

• **E. B. Pool,** for 10 yr a mechanical and experimental engineer with Chrysler Corp., has been appointed to conduct valve research work by Edward Valves, Inc., E. Chicago, Ind.

• **Robert Leeson** has been reelected president of the Universal Winding Co. of Providence, a post which he gave up in 1941 to enter the service. **Parkman D. Howe,** who served as president during Mr. Leeson's absence, becomes executive vice-president.

• **T. R. Rooney,** who for the past 17 yr has been associated with Western Pipe & Steel Co. of California as shop superintendent and general superintendent, has been named production manager at the S. San Francisco plant to fill the vacancy left by the resignation of **L. W. Delhi,** who recently completed 22 yr of service with the company as vice-president and general manager.

• **John S. Chafee** will join Saco-Lowell Shops of Boston, Mass., and Biddeford, Me., as a vice-president on Feb. 1. Mr. Chafee, who was from 1919 to 1942 with the Brown & Sharpe Mfg. Co. of Providence, served for 3 yr with the WPB in Washington, most of the time as director of the Tools Div.

• **L. E. Vogt** has been appointed eastern manager, intercity sales of the ACF-Brill Motors Co., New York. **Fred E. Dayes,** vice-president in charge of intercity sales, will make his headquarters in Chicago. **B. M. Walter** has been made director of industrial relations for the company.

• **George D. Seguin** has been appointed purchasing agent by Norton Co., Worcester, Mass., succeeding **Marcus W. White** who retires after 38½ yr service. Mr. Seguin has been with Norton Co. for nearly 20 yr and for the past 15 yr has been assistant purchasing agent.

• **Perry L. Bidstrup** has been appointed to the technical staff of the Midwest Research Institute, Kansas City.

• **Morris P. Neal** has been elected president of the recently formed A-B-C Packaging Machine Corp., Quincy, Ill. Other officers are **Dr. Johan Bjorksten,** vice-president; **Omer Rupp,** vice-president; and **Ralph Schrage,** secretary and treasurer.

• **Sir Holberry Mensforth** has resigned from his post on the board of directors of John Brown & Co., and also as chairman of Craven's Railway Carriage and Wagon Co., both of England.

• **W. S. Farren,** former director of the Royal Aircraft Establishment, Farnborough, England, has resigned to take up a new post as technical director of Blackburn Aircraft, Ltd. He is being succeeded at the RAE by **W. G. A. Perring.**

• **C. H. Wagner, Jr.,** secretary of the Parker Appliance Co., Cleveland, has been elected vice-president of the company.

• **Theodore C. Ekman** has been appointed to the position of assistant factory manager of the Peninsular Grinding Wheel Co., Detroit. Mr. Ekman joins Peninsular after serving 32 months in the U. S. Navy. He was formerly affiliated with the Norton Co. in the Resinoid Bonded Products Div. for several years.

• **Paul Conr.** has been named manager of the Lakeside Tool Corp., Chicago, a subsidiary of the LaSalle Engineering Co.

• **L. M. Weaver** has been named sales manager in charge of the Celfor Drill & Cutting Tool Div. of Clark Equipment Co. at Buchanan, Mich.

• **James W. Watson** has been appointed eastern regional sales manager of Nash Motors, Nash-Kelvinator Corp., Detroit. During World War II and until he joined Nash, Mr. Watson was assistant zone manager in Chicago for the Oldsmobile Div. of General Motors Corp.

• **E. R. Standfuss** has been appointed general manager of the Shunk Mfg. Co., Bucyrus, Ohio. He was formerly general manager of the Pennsylvania Shipyards of Beaumont, Tex. and the Gulf Port Shipyards of Port Arthur, Tex.

• **James M. Hush,** recently of the Los Alamos scientific group, has been appointed research physicist with Commonwealth Engineering Co. of Dayton.

• **John O. Logan** has been appointed an assistant general manager of sales of the Mathieson Alkali Works, New York, and **Harry P. Smith** has been appointed New York district sales manager, a post formerly held by **J. B. Peake,** who continues as an assistant general manager of sales.

• **William J. Cornelius** has been appointed manager of the specialties dept. of the A. B. Murray Co., Inc., Elizabeth, N. J. He will be in charge of stainless steel pipe and tubing, wire rope and other specialties. Mr. Cornelius was formerly chief of the carbon tube and aircraft tube sections, Steel Div., WPB, Washington.

• **James Keyes** has been placed in charge of the Billings & Spencer Co. Kansas City territory, working in the states of Kansas, Nebraska, Iowa and Missouri.

• **E. W. Bauman** has been appointed executive secretary of the Toncan Culvert Manufacturer's Assn., with offices in Cleveland.

• **C. B. Callomon,** formerly chief metallurgist at Western Gear Works, Lynwood, Calif., has severed his connections with the company, and has joined the Metal Control Laboratories of Los Angeles, in the capacity of general manager and chief metallurgist.

• **George Mason** has been appointed director of information in the public relations dept. of the American Locomotive Co., New York.

• **H. W. Surbrook** has been appointed comptroller of Detrex Corp., Detroit. Prior to coming with Detrex he specialized in industrial accounting while associated with the public accounting firms of Parker-Elsholz, and Haskins & Sells.

• **Thomas M. LaCrone,** for 10 yr a metallurgical specialist with General Motors, has been appointed supervisor of research and experimental laboratory of the Lithium Co., Newark, N. J.

• **Percy D. Siverd** has become special representative of the Pittsburgh Screw & Bolt Corp.'s sales office in Pittsburgh. **Alexander I. Stayman** has been appointed manager of sales, Pittsburgh and Southeastern districts, with headquarters also at Pittsburgh.

OBITUARY...

• **John Flynn,** 58, member of a family long associated with the machine tool industry in Cincinnati, died recently. He had formerly been associated in business with his father, the late John H. Flynn, founder of the Economy Machine Tool Co.

• **Dr. C. P. Rice,** president and treasurer of the York Corrugating Co., York, Pa., died Jan. 9.

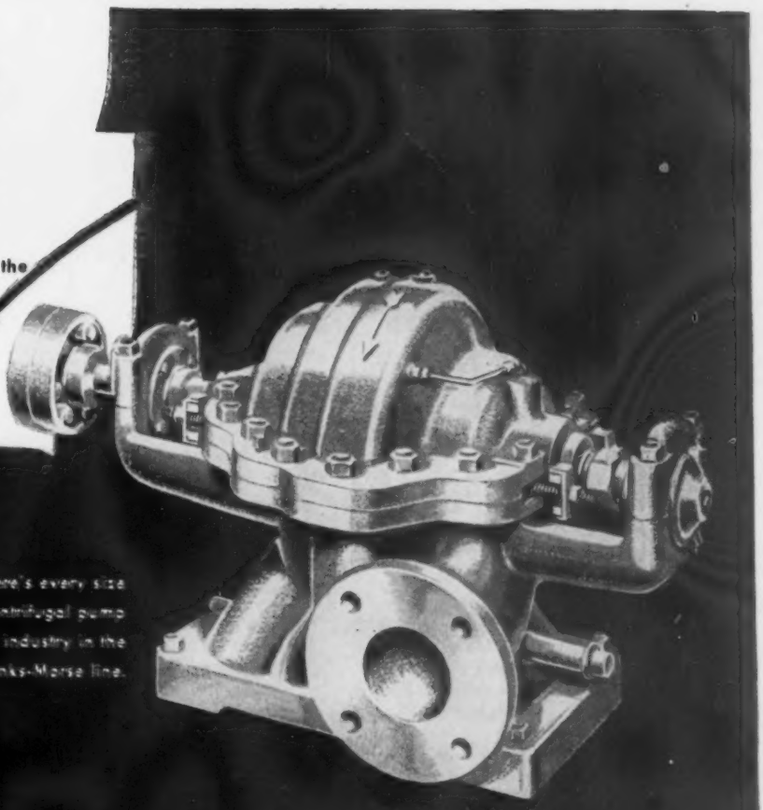
• **David Fineburg,** 59, president of the scrap firm of David Fineburg Co., Medford, Mass., died Jan. 12.

• **Col. Henry H. Adams,** 72, president of the Colonial Iron Co. of Pennsylvania and of the H. H. Adams Co. of New York until his retirement in 1930, died in Greenwich, Conn., Jan. 15.

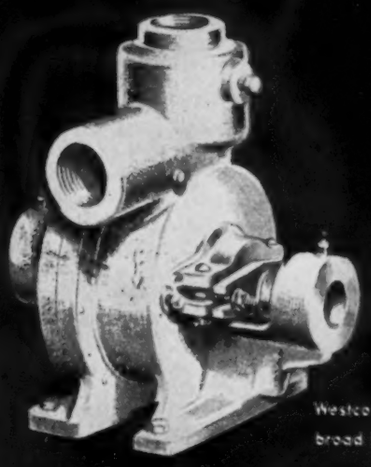
• **Col. Elmer H. Havens,** 81, who headed the steel concern of Hunter & Havens of Bridgeport, Conn., and was former president of the New England Iron, Steel & Heavy Hardware Assn., died recently.

Can ANYONE make a Pump?

Well, there's no law against it—except perhaps the "law of survival." It's a question of what *kind* of pump you want—and how *good* you want it to be. If you want a pump that will squeeze the last fraction of a cent in value out of the monthly power bill, that is designed to the very limits of hydraulic knowledge—built with the fine tools and complete facilities that such precision design requires—you'll want a Fairbanks-Morse pump.

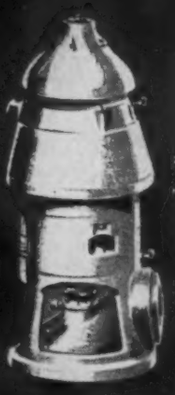


There's every size and type of centrifugal pump used in industry in the Fairbanks-Morse line.



Westco pumps: precision-built, broad in application.

WHEN YOU BUY a Fairbanks-Morse, Pomona or Westco pump, you get a design which is the result of accumulated years of research in not only our own laboratories but those of the universities' scientists whom we have retained.



For all vertical turbine pump work—the Pomona line.

THIS DESIGN and unlimited manufacturing facilities which only the largest pump manufacturers can offer you, combine to give you pumps superior in performance and reliability.

ANYONE CAN MAKE A PUMP—perhaps. But for proved value, skilled service—regardless of the type of pumping requirements or the amount of liquid to be moved—Fairbanks-Morse is an unquestioned leader. Call your nearest Fairbanks-Morse distributor or branch office.

FAIRBANKS-MORSE

A NAME WORTH REMEMBERING

PUMP DIVISION

Dear Editor:

SYNTHETIC METALS

Sir:

In your News Front Nov. 8 you mention that in the last few months there has been marked progress in the production of high-temperature resistant steels and that there has been developed "synthetic metals" which resist the effects of heat at notably higher temperatures than heretofore possible. I would be obliged if you could inform me if such synthetic metals contain cobalt or if you could give me the address of people interested in the production of such alloys.

ANTON GRONNINGSATER
230 Park Ave.,
New York 17

● Perhaps you have heard about Vitallium produced by the Austenal Laboratories, 224 E. 39 St., New York. This metal contains about 65 pct Co, 20 pct Cr, and 5 pct Mo. Additional details are contained in our Jan. 3 annual issue article on "Metallurgy", p. 124. On our News Front of Nov. 8, we were referring to a late-in-the-war German practice of powdered refractories and mixing this powder with powdered steel. The two were compressed in a graded way so that near the hub there was pure steel and near the periphery the blade was pure refractories. The Germans have used this on some jet aircraft, but data on the performance have been rather sketchy. There is a report in Washington regarding this technique, but when it will be made available, we cannot say.—Ed.

SCRAP INFORMATION SOURCE

Sir:

Have just noted the article on "Scrap" in the annual issue written by John Anthony. As our use of scrap runs to very high grade materials preferably with low manganese, low phos and sulphur, that is, under .05 and likewise with a copper content of under 0.05, our problem of getting scrap at this time is extremely difficult. In order to become more familiar with the origin, grading and production of scrap, we are wondering if you can refer us to any publication or book that deals with this subject. Any information that you can give us will be greatly appreciated, and we would also like to have the address of the headquarters of the Institute of Scrap Iron and Steel.

R. M. SANDBERG,
Columbia Tool Steel Co.,
Chicago Heights, Ill.

● The year book of the Institute of Scrap Iron and Steel, whose address is 1120 Connecticut Ave., NW, Washington 6, and a copy of the Salvage Manual for Industry published Sept. 1, 1943, by the Salvage Div., WPB, may give the information you desire. The latter is available from the Superintendent of Documents, Government Printing Office, Washington, at 50¢.—Ed.

TWIN-MOTOR DRIVES

Sir:

If you have any reprints of the article entitled "Twin-Motor Drives" by Frank W. Cramer in your issue of Oct. 11, the writer would be glad to have three copies. If reprints are not available, perhaps you could send tear sheets.

P. F. GROVE
H. A. Brassert & Co., Ltd.,
London, E. C. 4

● Sorry, we did not reprint the article "Twin-Motor Drives in Hot Reducing Mills." Consequently, we are sending you tear sheets.—Ed.

WIDIA PLANT INVESTIGATION

Sir:

I have read your article "German Cemented Carbide Industry" in the Aug. 30 issue, in which you mentioned the names of the people who made the investigations. It might only be of a certain historic interest, but in 1943 I worked with the Office of Strategic Services, which was trying to find the location of the Widia plant. On July 26, 1943, it was I who informed the Office of Strategic Services the location of this plant, whereupon further investigations could be made.

WALTER P. GARRICK
Garrick Co.,
Bridgeport, Conn.

CRITICAL TEMPERATURES

Sir:

I was quite pleased to see Mr. G. R. Brophy's article, "Cycle Annealing of Hypo-Eutectoid Steels," in the Dec. 13 issue of THE IRON AGE. This supplements my paper which you published two and a half years ago. However, I believe it should be pointed out that Mr. Brophy has misinterpreted my definition of "critical temperature."

In the June 24, 1943, issue of THE IRON AGE, in the first installment of my paper it was stated, "It should be understood that any reference to 'critical temperature' means only the temperature at which austenite begins to form when steel is heated, or the temperature usually referred to as Ac_1, or Ae_1." The procedure we have used in our laboratory for the last eight years to establish critical temperatures is to water quench small samples which have been heated for one hour at temperature at successive 10° F increments and to examine them for microstructure as well as to measure their hardness. Thus, our method is similar to that used by Mr. Brophy, although it is agreed that the five hour heating used by Mr. Brophy is better than the one hour heating which we use.

However, we have learned that it is not safe to rely on hardness measurements alone for the indication of the critical temperature, because of the fact that a slight but very definite increase of hardness is obtained when low carbon steels are heated to temperatures well below their critical temperatures and then quenched. This is undoubtedly attributable to the solid solution hardening of carbon dissolved in ferrite. Furthermore, samples which are lime cooled from these same sub-critical temperatures are definitely softer than those which are water quenched. The data in the following table illustrate these facts.

Effect of Water Quench on Hardness of Hypo-Eutectoid Steels Heated at 1200° F, at Least 50° F Below A_1 Temperatures Reported by A. G. Brophy.

							Rockwell B Time	
Grade	C	Mn	Si	Ni	Cr	Mo	Qu'ched	Cooled
3110	.09	.41	.22	1.20	.57	..	78	70
4620	.22	.55	.20	1.81	.11	.28	90	85
4340	.43	.68	.18	1.74	.81	.29	93	91

Mr. Brophy's reported critical temperatures are indicated to be too low not only when compared with the data in my paper, but, also, with those in "The Atlas of Isothermal Transformation Diagrams," published by U. S. Steel Corp. Both in my paper and in "The Atlas," the transformation curves for 4640 and 4340, and, also, that of 3140 in the "Atlas," show that austenite transforms to a ferrite-carbide aggregate *above* the temperatures reported by Mr. Brophy as the A_1 temperatures of these steels. Since it is impossible for austenite to transform to a ferrite-carbide aggregate above the A_1 temperature, it must follow that the critical temperatures reported in Table I of Mr. Brophy's paper are incorrect.

P. PAYSON.
Research Laboratory
Crucible Steel Co. of America.
Harrison, N. J.

● Mr. G. R. Brophy has informed us that there was no misinterpretation of Mr. Payson's definition of the "critical temperature" as indicated by inclusion of Ac_1 following the quotation from Mr. Payson's paper which appears in the third paragraph.

As to the interpretation of the point termed A_1, Mr. Payson may have some justification for his criticism. It is agreed that austenite decomposes at higher temperatures, but the aggregate may be one of ferrite, carbide and austenite, with the final disappearance of austenite at a considerably lower temperature. On the other hand, the Ac_1 point is under discussion, and the first transformation of the ferrite-carbide aggregate to austenite on prolonged heating very likely occurs at temperatures well below the conventional Ac_1 temperature.

Mr. Brophy has followed the empirical rule of heating for austenitizing at a temperature located at 80 to 100 pct of the temperature interval indicated by the hardness-temperature curve discontinuities with more uniform success. These discontinuities are termed A_1 and A_3 for the lack of a better designation, but Mr. Brophy is not prepared to defend the terminology too vigorously. —Ed.

5 REASONS WHY INDUSTRY LOOKS TO MUEHLHAUSEN FOR LARGE, HOT-COILED SPRINGS!

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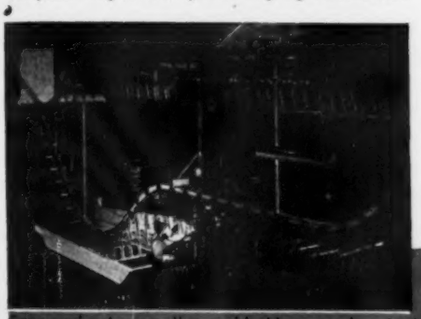

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This Industrial Week . . .

- ***Administration Seeking Steel Settlement***
- ***May Again Offer Steel Price Inducement***
- ***Loss so Far Reaches 2,900,000 Tons***

FEARFUL of the devastating effects of a long steel strike on reconversion, but reluctant to take over the steel industry, the Administration this week was again attempting to find some basis on which a settlement could be reached. High Administration officials suspected of being the same ones who entertained hopes of averting the steel strike a few weeks ago, are believed to be seriously seeking a steel price basis which would allow the U. S. Steel Corp. to accept the President's compromise offer of 18.5¢ an hr.

Contrary to reports that steel industry leaders were to meet in Washington this week to find a means of settling the steel strike, it is much more likely that the Administration asked Benjamin F. Fairless, U. S. Steel president, to come to Washington and again talk over the steel price situation. This sudden trip by Mr. Fairless to the Capitol, where he conferred with high governmental officials follows fairly well the same pattern of approach adopted by the Administration in its previous effort to forestall the steel strike.

BEFORE the U. S. Steel makes any move toward resuming negotiations with the union, it is expected that something better than a promise of a price increase will be demanded. Despite the steel firm's attitude that it did not want voluntarily to become a party to an 18.5¢ wage increase and a large increase in steel prices because of its possible inflationary effect, a request by the Government to do so supported by a big enough price increase to compensate for past costs and a new wage increase would probably be acceptable.

Whether or not the steel strike is settled quickly apparently rests squarely upon the attitude the Government takes with respect to steel prices. The company has flatly refused to go any further than its 15¢ an hr offer. Philip Murray having accepted the President's compromise offer and called a strike to back it up, is expected to hold out for his wage demand and to have no interest whatsoever in what price deals are made between the Government and the steel industry.

The steel strike this week at some points was giving rise to an increased show of bitterness as pickets attempted to stop nonunion maintenance workers from entering the mills. In most plants agreements had been worked out between the union and the companies but several sore spots in Chicago and Pittsburgh have developed. Indicative of the attitude of many supervisory employees to management has been the support given to striking production workers by foremen at several plants.

IN one instance, the Foremen's Assn. of America withdrew its members from forces carrying on maintenance work within a plant when the management failed to conclude an agreement with the steel workers union to have such work done by union workers. A group of unorganized foremen followed a similar procedure when they refused to help keep coke ovens under heat at Carnegie-Illinois, Joliet, Ill., coke plant—an action which caused severe damage.

For the second week of the strike, steel ingot production remains at the unprecedented low of 7 pct of rated capacity. Up to the end of this week the country will have lost approximately 2,900,000 tons of steel ingots since the strike began. Much of this cannot be made up because before the strike most companies were operating at as high level as possible. On the other hand, including only the hourly employees in the steel producing companies, more than $30,000,000 in wages will have been lost by the end of this week. The total wages lost is much greater because of shutdowns at steel fabricating and processing plants.

During the first week of the strike most steel consumers were unaffected by lack of steel production because of inventories and because of steel already on the way to their plants. This week, the number of steel users affected was slightly larger, but had by no means reached serious proportions. It is expected that the real pinch in steel supplies will come after the steel strike goes into its third week, with far more serious repercussions if it lasts four weeks or longer.

THE earliest mass casualty list is expected to come from the foundry industry whose dependence upon pig iron makes it vulnerable. Tight inventory conditions even before the strike, coupled with lack of cast scrap, left the foundries in poor shape when the strike started.

Although new orders are slightly lower than during most of the pre-strike period, income business is still heavy. Mills are taking advantage of the strike period to crystallize advance production schedules. They are trimming future quotas to enable cleaning up of carryover tonnage which has been scheduled but not produced.

Consumers whose regular sources of supply have been cut off are exerting pressure upon the few steel companies remaining in production, but this is bearing little fruit. Although some of the customers of nonstruck steel companies have themselves been shut down, steel which they would receive is being diverted to catch up on other orders which have been delayed. Thus to some extent steel producers which have not been shut down, and there are relatively few, are taking advantage of the strike period to clean up the carryovers.

Causing almost equal concern as the steel strike to users of electrical motors and controls, is the electrical equipment tieup. Disruption of already extended delivery schedules foreshadows a period in which users dependent upon electrical components may be unable to complete their assemblies.

• **WEST COAST BASING POINTS**—Bethlehem Steel Co. will set the pace in announcing new West Coast basing point prices within the next 60 days, steel quarters believe. Sparrows Point prices plus water freight will continue to be the governing factor which means another rebuff for West Coast customers who have been hoping for prices more nearly resembling those in the East. With Coast steel buyers offering to buy from midwestern mills and pay the freight, there is little incentive for eastern mills to trim materially the differential between East Coast and West Coast prices. The West Coasters can thank the OPA, which has been doing considerable investigating, for whatever relief they get in the new announcement. Other eastern mills will fall in line with Bethlehem.

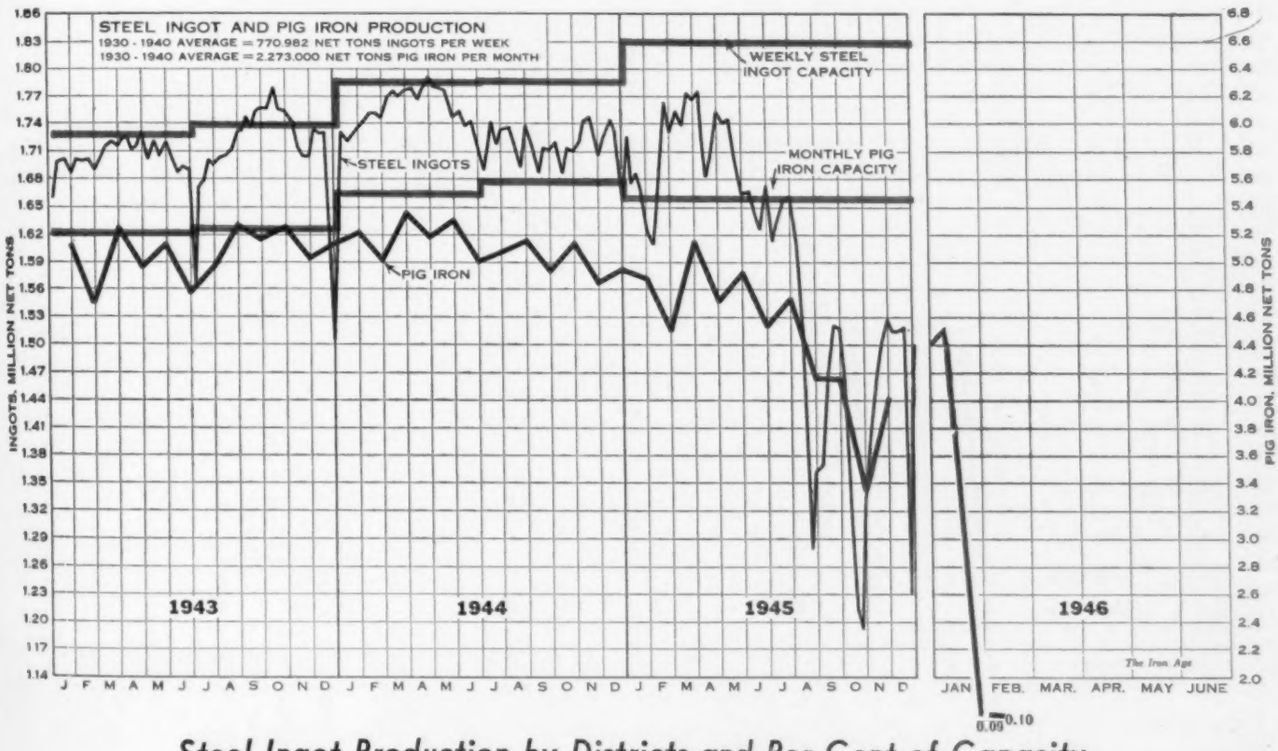
• **SOUP FOR THE STRIKERS**—Inland Steel Co. has set up a soup kitchen adjoining its Indiana Harbor, Ind., mill for use of union pickets. Gas, lights and plumbing give the strikers shelter from the cold. Topping off this employee relations scoop was a newspaper photograph showing a company industrial relations official warming his hands over a picket line fire along with the strikers.

• **ALUMINUM SHEET SALE**—The Curtiss-Wright Corp. has sold 6,000,000 lb of aluminum sheets to the Rochester (N. Y.) Iron & Metal Co. for "approximately $1,200,000." It was emphasized that the sheets were not scrap and could be used to alleviate any shortage of this material in private industry. The sheets were the property of the government and the proceeds were credited to the Army. The Rochester firm's bid was 59 pct of the original cost. Reports in local trade circles indicated the material had already been resold.

• **SPARROWS POINT BASING POINT**—Bethlehem Steel Co. has made Sparrows Point, Md., a basing point for tin mill products produced by its plants there. The base prices are: Coke tinplate, hot dipped, $5.10 a 100 lb; electrolytic tinplate, 0.25 lb coating, $4.45 a 100 lb; electrolytic tinplate 0.50 lb coating, $4.60 a 100 lb; electrolytic tinplate 0.75 lb coating, $4.75 a 100 lb; manufacturing terns, $4.40 a 100 lb; and black plate $3.15 a 100 lb. The change is effective on shipments made on and after Jan. 1, 1946.

• **IRON ORE CONSUMPTION**—Cumulative consumption of iron ore in the United States and Canada during 1945 amounted to 74,575,878 gross tons, compared with the 1944 total of 87,247,000 gross tons, according to the Lake Superior Iron Ore Assn. report. December consumption totaled 6,099,134 gross tons, compared with 5,611,627 gross tons during November and 7,090,174 gross tons during December 1944. Stocks on hand Jan. 1 totaled 39,058,540 gross tons. On Dec. 1, 1945, stocks on hand amounted to 44,706,399 gross tons and 37,823,876 gross tons on Jan. 1, 1945.

• **CHICAGO DPC STEEL PLANT ON BLOCK**—The South Chicago, Ill., war-built steel plant operated by the Republic Steel Corp. under a DPC interim lease agreement has been put on the market by the War Assets Corp. for purchase or lease. Terms for the sale or lease are similar to those provided for in the disposition of the government-owned Geneva Steel plant, outlined in THE IRON AGE of Dec. 18, 1945. These call for purchase on the basis of all cash or credit or leasing with "options to purchase upon reasonable terms at any time prior to two years preceding the termination of the lease." Like bids for the Geneva plant, the War Assets has asked that they be submitted no later than April 1. The Republic plant has the following producing units, whose annual capacity is stated in net tons: 75 byproduct coke ovens, 405,000; one blast furnace, 450,000; four basic openhearth tilting furnaces, 571,000; three 70-ton electric furnaces, completed, 250,000; six 70-ton electric furnaces, almost completed, 500,000; one 44 in. blooming mill, 960,000; one 36 in.—32 in. bar mill, 480,000 tons.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 22.....	3.0	8.0	0	2.0*	0	0	52.0	0	24.5	15.0*	37.0	14.0	0	7.0
January 29.....	3.0	8.5	0	2.0	0	0	52.0	0	25.0	15.0	37.0	14.0	0	7.0

* Revised

Administration Seeking Steel Strike Settlement Basis

New York

• • • **Reluctant to seize** the steel industry, yet fearful of the devastating effects of a long steel strike on reconversion, the Administration was again this week seeking some basis for settlement. The same "high administration" officials who gave rise to optimistic hopes a few weeks ago for avoiding the steel tieup are again voicing "hope" for a speedy settlement.

Knowing that the U. S. Steel Corp. and the steel union were further apart than ever this week, an attempt was being made by the Government to furnish a new basis for a possible break in the deadlock. The same approach used in trying to prevent the strike—promise of price relief—is being taken. Before the week is out or soon thereafter, it is expected that new promises of price relief slated to take care of past increased cost accumulations and compensation for any new wage advance to be given, will be made.

That Mr. Fairless, U. S. Steel Corp. president, went to Washington early this week in an effort to settle the strike, appears to be as far from the truth as to say that Philip Murray went to Washington for the same reason. The sudden trip to Washington taken by Mr. Fairless Monday of this week when he conferred with high governmental officers, was apparently at the request of the Government. This is the same pattern utilized by the Administration when Washington authorities interrupted wage negotiations between Mr. Fairless and Mr. Murray recently by holding out an offer of first a $4 a ton increase in steel prices and later a higher figure if the wage controversy was settled. (OPA officials conferred early this week with the steel fact-finding board but Mr. Fairless was not present.)

This time it is expected that before any further wage negotiations are entered into between U. S. Steel Corp. and the union, Mr. Fairless will insist that any promise of a price increase be put down in black and white. U. S. Steel so far has avoided being put in a position where it can be said

By TOM CAMPBELL

o o o

that it started an inflationary spiral by agreeing to an exceptionally high wage demand which would ultimately have to be supported by an unusual price increase.

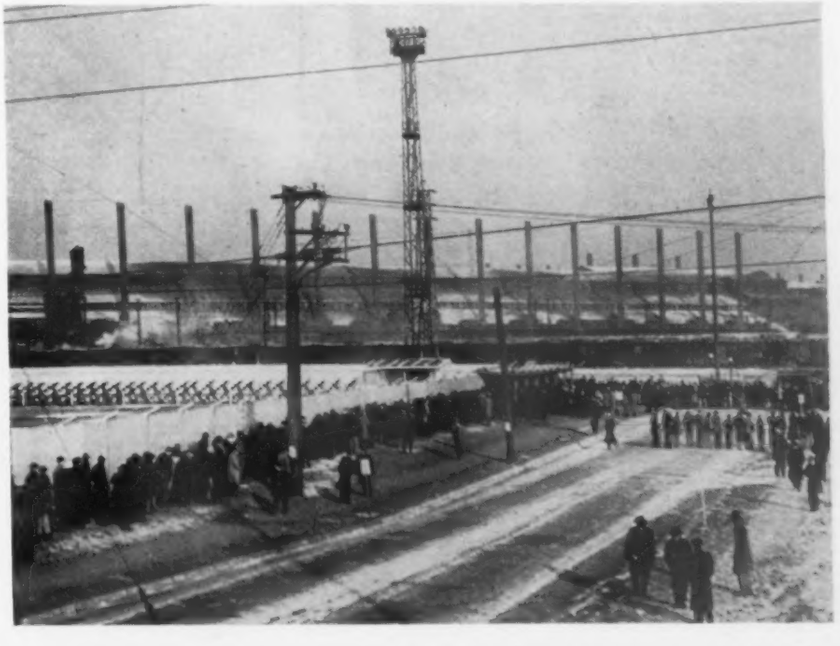
Mr. Murray's position this week needs no elaboration. Having accepted President Truman's proposal of 18.5¢ an hr and having called a national steel strike to back up the union's demand, it is not expected that he will retreat from his stand in any way. The entire steel wage controversy is now as it has been for the past several weeks — an issue between the Administration, which has gotten so far into the picture that it can't get out, and the steel industry.

The U. S. Steel Corp., while it may not voluntarily trade an 18.5¢ an hr increase for much higher steel prices would nevertheless by its long record, acquiesce to such a demand from the Administration. At no time in the corporation's history since the early twenties has it seriously balked any Administration whether it be Republican or Democratic. This was clearly shown in 1937 when it broke all past precedent and signed a contract with an outside union even though the remainder of the steel industry was bitterly opposed to such action.

There seems this week to be no chance of a "break" in the solid front put up by the steel industry through Mr. Fairless on the wage question. While steel leaders may bicker among themselves as to what is the best policy, whatever the U. S. Steel Corp. does, will determine the action of the majority of other steel officials. Reports that there have been two blocks, those favoring early settlement and those favoring a last ditch fight, is no surprise to those familiar with the steel industry.

It seemed clear this week that the steel industry would not grant an 18.5¢ an hr wage increase unless definite provision was made to compensate for past cost increases and to remove at the same time the increased cost for such an advance in wages. But the industry may hold out for more. The length of the strike is tied up definitely with steel prices—a Government function.

THE EAGLE SCREAMS: *Striking steel workers shown here receiving their last paycheck may wait a long time before another one if a government move involving steel price increases is not made soon. Despite denials from some quarters a few steel leaders are attempting early this week to obtain firm price commitments in order to speed settlement of the strike.*



Small Plants Ask Voice in Wage Negotiations

Pittsburgh

• • • **Dragged into the** steel strike by their heels about 112 companies in the western Pennsylvania area, members of the Tristate Industrial Assn., protested the union-management actions in the current steel wage dispute. About 56 of these companies are on strike with the remaining companies facing shutdowns because steel is not available. None of the companies is part of the basic steel industry or affiliated with any basic producer. They are fabricators, converters, and manufacturers—with only a few being steel producers.

As an organization, these companies ask for a voice in their own labor negotiations and ask that they not be forced into accepting the decision of the U. S. Steel Corp. in the matter of wage increases. Charles R. Barton, vice-president of National Supply Co., summed up the companies' case. He pointed out that these fabricating companies now are closed by strike despite the facts (1) that they were not represented and the facts regarding them were not considered in the White House conferences and (2) that they have had no real opportunity to bargain collectively with their unions.

Further, it was pointed out that almost without exception, the miscellaneous users of steel need price relief even without increased wages. Many have made appeals and some are now operating at a loss.

Col. James S. Ervin, president of Mackintosh-Hemphill Co., said that many steel manufacturing firms in this area will refuse to sign new CIO contracts on the same basis as the Big Steel settlement, if and when this settlement occurs. He said that small companies have always been forced to go along with Big Steel. They have been given no opportunity to negotiate wages paid by the individual companies, and have to accept the same settlement as the big corporations. This can no longer be done. Many firms cannot do it and stay in business.

Robert B. Heppenstall, president of Heppenstall Co., said that an offer of a 15 pct wage increase had been favorably considered by the local union but was turned down by the union top. John P. Roche, assistant to the president of Oliver Iron & Steel Co., pointed out that his firm had given the union full financial data on the company last October, but has heard nothing from the union since that time.

Col. Ervin pointed out that most negotiations between these companies and the CIO since 1937 have been by telephone, usually when the union called to ask "if we will pay the same as Big Steel." A. V. Murray, president of Scaife Co., supported Col. Ervin's contention that fabricators had no voice either in union negotiations or the White House conferences and added that the union had no authority to bargain with companies other than those which are basic steel producers.

While the Tristate Industrial Assn. favored a general wage increase, they pointed out that it is not practical at the present time and that any increase will be impossible for the member companies without some price relief.

The 56 companies in the association that are now on strike employ about 51,000 men. There are about 650 more such miscellaneous steel fabricating companies in the United States which have contracts with CIO-USWA. The only companies that will benefit from a price increase on steel by the ton, Mr. Murray of Scaife Co. said, are the big steel companies, while the fabricators and converters will be doubly penalized by wage and price increases.

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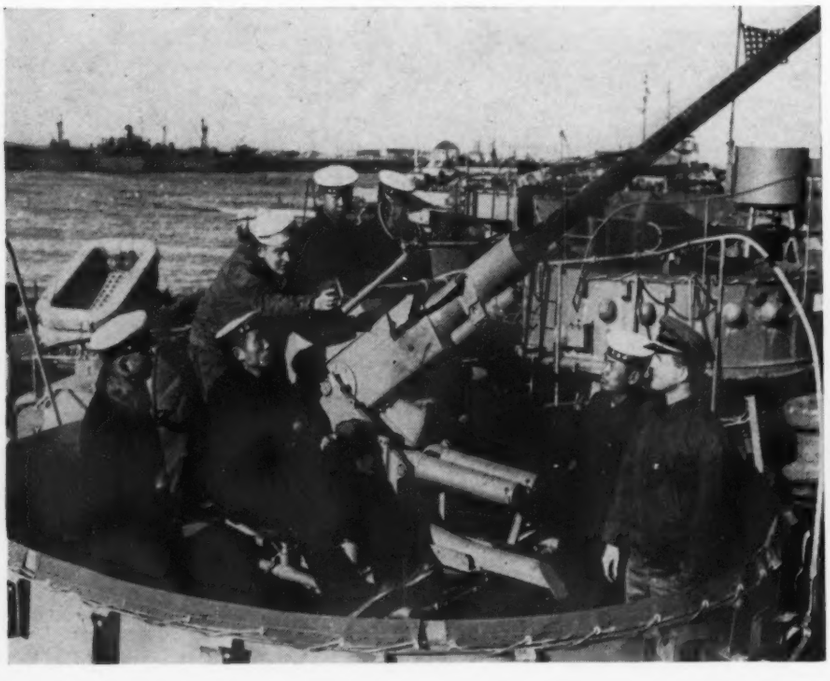
Pittsburgh

• • • **Philip Murray,** president of the CIO-USWA, made public a letter he wrote to Arch V. Murray, president of the Scaife Co., Oakmont, Pa., on the question of collective bargaining with steel fabricators and other "small" concerns.

He also made public a list of companies that have signed a contract providing for an 18.5c per hr wage increase. With the exception of the Kaiser plant at Fontana, Calif., which is a basic steel operation, all are "small" fabricating or processing firms.

The president of Scaife Co. was quoted as speaking in behalf of

LENDS A HAND: *U. S. Navy has established a small training unit at Tsingtao, China, in a move to assist in the operation of many surplus amphibious and cargo craft being sold to China to rehabilitate it.*



an "association of steel fabricating concerns" in newspaper reports which complained that the CIO-USWA did not engage in collective bargaining with them.

"This statement as you must know is not consistent with the facts," Philip Murray, CIO-USWA president wrote. "The district directors of our organization, together with the negotiating committees representing the affected employees, have at all times been prepared and are now prepared to engage in collective bargaining with any of the companies at whose plants there is now a strike.

"As you well know, most of the companies for whom you have spoken have in the past repeatedly advised the representatives of our union that they could not negotiate regarding the union's wage demand until the basic steel industry has consummated a final agreement with the union.

"It has been this position of the steel fabricating companies, to which you have referred, which has made impossible any effective bargaining between such companies and our union."

The companies which have signed 18.5c an hr wage increase agreements, referred to in Mr. Murray's statement, are:

	Employees
Pottstown Pipe Products Co., Pottstown, Pa.	20
Alloy Rods Co., York, Pa.	89
Beryllium Corp. of Pa., Reading	250
Columbian Cutlery Co., Reading	60
Dick Bros., Inc., Reading	170
Reading Hardware Corp., Reading	120
Lee-Norse Co., Charleroi, Pa.	36
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.	35
Columbia Radiator Co., Versailles Twp., Pa.	500
Feick Mfg. Co., Cleveland	50
Browning Crane Co., Cleveland	220
Buckeye Forging Co., Cleveland	167
H. Kramer & Co., Chicago	213
L. A. Cohn & Bros., Cicero, Ill.	82
R. Lavin & Sons, Inc., Chicago	106
A. M. Castle & Co., Chicago	92
Judson Steel Co., Emeryville, Calif.	156
Pacific States Steel Co., Niles, Calif.	127
A. M. Castle & Co., Vernon, Calif.	30
Jacuzzi Bros., Inc., Oakland, Calif.	..
Southwest Steel Rolling Mills Co., Los Angeles	40
Cutting Engineering Co., Vernon, Calif.	21
H. & L. Machinery Co., Huntington park, Calif.	31
Rogers Pattern & Aluminum Foundry, Los Angeles	98
American Tire Machinery Co., Los Angeles	98
C. E. Howard Co., Vernon, Calif.	154
Lehigh Foundries, Inc., Easton, Pa.	120
Pittsburg Water Heater Co., Carnegie, Pa.	60
Acheson Mfg. Co., Rankin, Pa.	400
Kaiser Industries, Inc., Fontana, Calif.	2300

Murray's Czar Operation Of DPC Steel Plants Judged Impossible

By T. E. LLOYD

o o o

Pittsburgh

• • • **The readiness of** Philip Murray to suggest that Henry Kaiser be made "czar" of government-owned steel facilities, placing them in operation under his direction, showed that either Mr. Murray was playing for public favor in his wage fight or that he had an appalling ignorance of the steel industry and how it operates. Such a move would result in a shutdown of this capacity within a short time because of the lack of finishing capacity.

From an examination of government-owned facilities in steel mills, shown in the accompanying table, it is evident that the great bulk of government property is centered in the basic operations. The government owns capacity for the annual production of 4,599,400 tons of coke, 5,314,000 tons of iron, 1,394,000 tons of electric steel and 4,215,000 tons of openhearth steel. It has 2,542,000 tons of blooming mill capacity and 1,350,000 tons of slabbing capacity. On the finished steel side of the ledger, government-owned capacity includes 1,677,000 tons per year of plates, 690,000 tons of bar mill capacity, 250,000 tons of structural items, 30,000 tons of cold-finished bar manufacturing capacity and between 50,000 and 75,000 tons of electric welded pipe capacity on Yoder type mills. Also there is perhaps an equivalent capacity for seamless and other types of tubular products.

Government steel producing capacity far outweighs finishing capacity and, without the latter, the former is useless. In addition, the government steelmaking capacity, about 5,500,000 tons a year, is merely a drop in the bucket against total steel demand, even if Kaiser's privately-owned Fontant capacity of 750,000 tons a year is added. Further, Kaiser's position with the Fontana plant, which has structural, bar and plate capacity, does not place him in a position of being too helpful to supply consumer demand.

However, on the supposition that Mr. Kaiser were placed in charge of all government-owned steelmaking facilities and told to get them into operation, there are several possibilities. Much of this capacity is within the plants of steel companies. Legal action would be necessary to obtain access to the government facilities and provision would have to be

RUSSIA BOUND: ***Despite the nationwide steel strike, thousands of tons of steel products, including heavy gage steel pipes, farm implements and machinery, are being shipped to Soviet Russia. Whether the material comes under lend-lease or purchase order, is unknown.***

made for the handling of materials and steel over company-owned railroads. Use of company trucks would have to be guaranteed, as well as the use of cranes, ladles, ladle cars and many other things which steel companies have bought to service government-owned facilities.

Next, it is unlikely that steel producers would relish Kaiser-government employees roaming about their plants and properties. This would cause considerable trouble and steel companies could probably take action against trespassing on private properties. Further, they may even be liable for accidents on their properties.

In the matter of producing basic products like ingots and semi-finished, which could not be finished because of the lack of finishing capacity that is government owned, there would arise the public hue and cry to force steel companies either to finish the steel or be subject to some confiscatory action that would permit the Kaiser-government steelworkers to use such private facilities as were necessary for finishing. That, in itself, would form an opening wedge for government to invade the business field and be a threat to the privacy of both business and individuals.

Such a program as making Kaiser the "czar" of government steel plants would put government into the steel business. If past performance is any indication of the future, this would mean that the government would be in the business permanently, since the bureaucratic system seems to retain control of any position ever gained. This, in effect, would put a stop to the disposal of what is now classed as government surplus steel capacity, and the industry would be faced with the threat of outside management within its own individual plants.

It hardly seems possible that Mr. Murray urged such an action for any reason other than to gain public support in his campaign to gain higher wages. Mr. Murray has been in the steel labor field long enough and has sufficient advisory staff to realize that as a strike-breaking tool, his plan has publicity value. The fact that steel can be made doesn't necessarily mean that it can be used, since ingots in themselves are of little value.

Coke Ovens Suffer $20 Million Damage

Chicago

• • • **Support of striking** works by 20 unorganized supervisory employees at the Joliet, Ill., coke plant of Carnegie-Illinois Steel Corp. last Wednesday led to severe damage to four coke oven batteries there through lack of heat.

Insistance by the United Steel Workers Union that only union members be allowed in the plant for maintenance operations prevented an agreement with the company by which necessary workers would be allowed to pass into the plant to keep the coke oven batteries under heat. Although the plant was completely unionized with the exception of one clerical worker, the union refused to allow this man into the plant. The company insisted that he be allowed to enter along with unionized maintenance workers, which prevented an agreement that any workers be allowed to enter the plant. Forty-four supervisory employees stayed in the plant when the strike started to maintain the coke ovens under heat, but Wednesday 20 of them decided to support the steel workers and left the plant. Supported by state police, 22 supervisory employees entered the plant shortly afterward through a hail of missles. When the state police were withdrawn the following day, the foremen transferred from Gary were directed by the company to leave also because of fear that strikers would storm the plant. This left 24 men from the original group in the plant, insufficient to maintain the coke ovens under heat.

The company estimates a loss of approximately $20 million. Should damage be as great as expected, it is regarded in the trade as possible that the ovens will not be rebuilt, although their output is necessary to maintain a full operating rate at Gary works. The coke ovens were built at Joliet originally to supply blast furnace operations there, but these furnaces since have been moved elsewhere. Logically, additions might be made to coke oven facilities at Gary to Supply the Gary works.

Government-Owned Steel Plant Facilities

PRODUCT	ANNUAL CAPACITY NET TONS
Coke	4,599,400
Iron*	15,314,400
Steel	5,609,300
Electric furnace	1,394,300
Openhearth†	4,215,000
Blooms	2,542,800
Slabs	1,350,000
Plates‡	1,677,500
Bars	690,000
Structurals	250,000
Cold-finished bars	30,000
Electric welded tubes (Yoder type mills)	50,000 to 75,000
Other tubular products	50,000 to 75,000

* Does not include about 800,000 tons of capacity in incompleted blast furnaces.
† Includes 30,000 tons of acid openhearth steel capacity.
‡ Includes 190,000 tons government-owned capacity on a mill that is rated at 250,000 tons a year.

Canada Feels Effects Of Steel Strike; Sets Up Emergency Controls

Ottawa

• • • **Steel control** has been reestablished in Canada on a temporary basis to meet an emergency situation arising from the United States steel strike, Hon. C. D. Howe, Reconstruction Minister, announced. He said a meeting of the Wartime Advisory Steel Committee was called to work out plans for increased production from Canadian mills and for any control measures considered necessary. Mr. Howe stated:

"If the United States steel strike is prolonged the effect on Canadian industry will be disastrous. One month's stoppage virtually would paralyze the Canadian economy, and cause widespread unemployment affecting hundreds of thousands of workers. Our railways, mines, communications, lumber and manufacturing industries, to a great extent, would cease to function for lack of repair and maintenance parts."

Martin A. Hoey of Montreal, executive assistant to the general manager of the Canada Cement Co., Ltd., and formerly associate steel controller for the munitions department, has been appointed steel controller. He will have the same broad powers exercised by

the former steel controller Fred B. Kilbourn of Montreal under war conditions.

Mr. Howe said Canada was dependent on U. S. mills for vital steel supplies. The U. S. mills provide 50 pct of the sheet steel used in Canada; 75 pct of the tinplate and blackplate used for making food containers and other cans; and all alloy sheets, such as are used widely in the electrical manufacturing industry, large structural shapes, skelp used for making wrought iron pipe and wire, alloy and high speed steels for making drills.

The government is taking every possible step to bring Canadian steel production up to its maximum to meet the emergency created by the United States steel strike, Reconstruction Minister C. D. Howe, stated. Steel production will be increased by 10,000 tons a month and pig iron output stepped up a like amount by Algoma Steel Corp., Sault Ste. Marie. In addition arrangements have been made whereby the Dominion Steel & Coal Co., Sydney, N. S., will ship 4000 tons of billets a month to Montreal to be converted into bars and other steel shapes. Throughout the industry nail production will be increased to take care of demands of Wartime Housing Ltd., and the construction industry in general.

Ford and Chrysler Settlement May Not Influence G. M.

Detroit

• • • **Settlement of issues** between the CIO United Auto Worker's Union and Ford and Chrysler cleared the labor deck here last weekend, but still left unsettled the local General Motors Corp. strike. However, it was universally admitted that the reach of agreements between the union and two of the members of autodom's big three was a major forward step.

The big question concerned the amount of influence which the settlements—Ford's providing an 18¢ an hr raise, Chrysler's one of 18.5¢—would have on the General Motors strike, 72 days old as of Jan. 31. The early indication was that it had not materially changed the situation.

General Motors people were silent in reaction to the settlement. Walter Reuther, UAW vice-president who has conducted the GM drive, would say only that the General Motors workers would have to be given more than the increases in the other two cases, to compensate for the time of their tieup—a strike, he said, which was actually in behalf of their fellow workers in the other companies as well as themselves.

Detroit feels that General Motors will not consider settlement as long as the steel strikes continue, due to the difficulty, if not impossibility, of their resuming on anything like a normal basis as long as the walkouts in the mills persist. Meanwhile, this week saw the start of hearings on a complaint issued before the National Labor Relations Board, charging GM with unfair labor practices. General indications were that no settlement negotiations would be started while these hearings continued.

It should be noted parenthetically that any General Motors settlement could be expected to exercise wide influence in the determination of a steel strike settlement formula. That is, if General Motors were to settle shortly at any definitely agreed raise figure, the strike of the steel workers might come to a speedy conclusion on the same basis. This viewpoint grows out of the belief that General Motors problems and solutions are a bellwether for the country at large.

With respect to the Chrysler and Ford settlements, the interesting thing about both of them is the way they make some as yet unspecified provision for company security. This is brand-new in auto industry bargaining contracts, and is a general new trend in all industry.

In the case of Chrysler, the contract states that "the union agrees that it will not oppose the discharge or discipline of anyone who instructs, leads or induces another employee to take part in any unauthorized strike." Less definite is the statement that both parties recognize the desirability of reattaining prewar production standards, which are generally agreed to have slipped materially during the war years.

The 18.5¢ an hr Chrysler raise

RACE: *Here are Chrysler officials and UAW officers talking over wage negotiations last week just before the home stretch was reached on an agreement.*

applies to all wage classes equally and is estimated to be piled on top of a present day average of $1.14 per hr. Percentagewise, then, the raise averages 16.2 pct. It sets a new minimum of $1.075c an hr in the Detroit area, against 89c previously. The terms also provide an increase from 5 pct to 7.5 pct as a night shift premium.

Simultaneously, Chrysler arrived at a new contract for its salaried office and plant protection people under UAW jurisdiction, raising them $32.50 per month. This advance has been since applied to all salaried people.

At Ford the details of the agreement remain to be worked out, but there is a clear understanding between the parties. Ford has modified its company security demands, eliminating the proviso, it is understood, that the pay raise does not become effective until unit production of 80,000 vehicles monthly is achieved. However, Ford is believed to have won out in its demands for management prerogatives which include firm disciplining of wildcat strikers.

The Ford raise of 18c an hr comes on top of a previous average of $1.21, and hence figures around 14.9 pct. It is estimated to amount to an addition of about $40 million on the company's annual wage bill.

Bearing Stockpile Good

New York

• • • **Production of** ball and roller bearings, essential to the manufacture of all mechanical equipment ranging from wheelbarrows and home appliances to locomotives, automobiles, farm equipment and heavy industrial machinery, will not be immediately halted by the steel strike, H. O. Smith, executive secretary of the Anti-Friction Bearing Manufacturers Assn., said recently.

"The anti-friction bearing industry has a $10,000,000 stockpile of raw bearing steels, which should last from 30 to 45 days," Mr. Smith declared. "Only 4 of the 34 member companies of the association are themselves involved in labor difficulties, and the 30 remaining manufacturers can build up a fair backlog of ball and roller bearings while their steel supply lasts."

Merchant Furnaces To Continue Operations

Philadelphia

• • • **At the inception of** the steel strike it was assumed that the shutdown would include all steel producers and blast furnaces. However, a survey of eastern Pennsylvania plants reveals that merchant furnaces have been placed in a special category by the union which permits them to continue in operation despite the strike.

Blast furnaces now in operation in that area include the Tonawanda Iron Corp. furnace at North Tonawanda, N. Y., a subsidiary of the American Radiator & Standard Sanitary Corp.; the Interlake Iron Corp. Perry Plant furnace at Erie, Pa.; The E. G. Brooke Iron Co. furnace at Birdsboro, Pa. Other blast furnaces operating in connection with a steel plant, such as Alan Wood's Swedeland, Pa. plant and the blast furnaces of Bethlehem Steel Co. have been closed down.

Moreover, certain steel producers operating with independent unions are still able to continue in production. Among these are included the Midvale Co. at Nicetown, Philadelphia; the Birdsboro Steel Foundry Co. at Birdsboro, Pa. and the American Chain & Cable Co. plants.

Files Mass Picketing Injunction Request

Pittsburgh

• • • **Carnegie-Illinois Steel** Corp., Monday charged pickets with barring maintenance and certain supervisory workers from entering its Homestead Works, and filed the first injunction request in the Pittsburgh district since the steel strike started nine days ago. A hearing was set for Tuesday, Jan. 29, at Common Pleas Court, at which both the corporation and the union will be represented.

The injunction was asked against local 1397 CIO-USWA, the local's officers and officials of the international union. The action, filed Monday, charged "mass picketing" since Jan. 25, during which time only persons with the title of superintendent and up were permitted into the plants. The injunction request asks that the number of pickets at each gate be limited to no more than ten.

In asking for the injunction, Carnegie-Illinois explained that there were no objections to peaceful picketing but that damage to the plants would result if pickets continued to keep certain workers from entering the plants at Homestead, Munhall, West Homestead, Swissvale, and Rankin, which comprise the Homestead Works.

Pickets were charged with congregating at the gates in groups numbering up to 200 and standing shoulder to shoulder, several deep, thus restraining personnel other than superintendents from entering the plant.

New Ship Disposal System

London

• • • **A new basis** for computing disposal terms for British surplus cargo vessels is expected to be announced in the near future. These ships, built for the British government during the war, were offered to ship owners at cost prices in partial replacement of vessels destroyed, but a number of the ships were not acquired by industry.

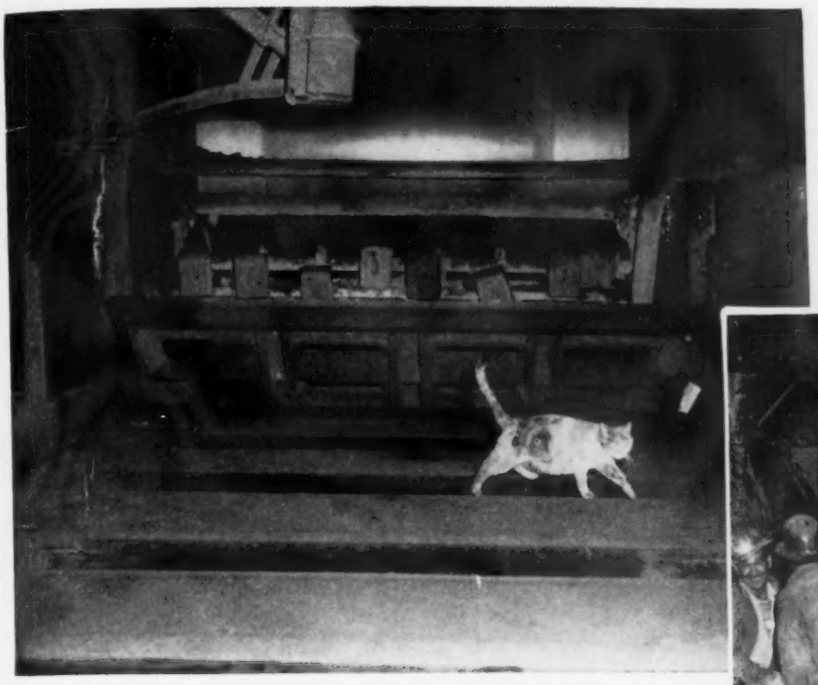
The new system is expected to take the form of an arrangement whereby the government sets a minimum price, and accepts the best offer over that figure. It has been suggested that Liberty ships, which cost about $1,200,000, and upwards to build, be offered at a minimum of $520,000.

Limits Steel Inventories

Washington

• • • **Taken as a** precautionary measure because of the steel strike, CPA on Jan. 29 issued a directive limiting grey castings and steel inventories to 45 days, or the practical working inventory, whichever is lower. Heretofore, the steel inventories were limited to 60 days. The products affected in addition to grey iron castings are carbon steel bars, carbon and alloy sheets and strips, structural shapes and piling, and tin plate. All other products are on a practical working inventory basis. The new order becomes effective Feb. 1.

Most Steel Plants Down But a Few Operate



LEFT

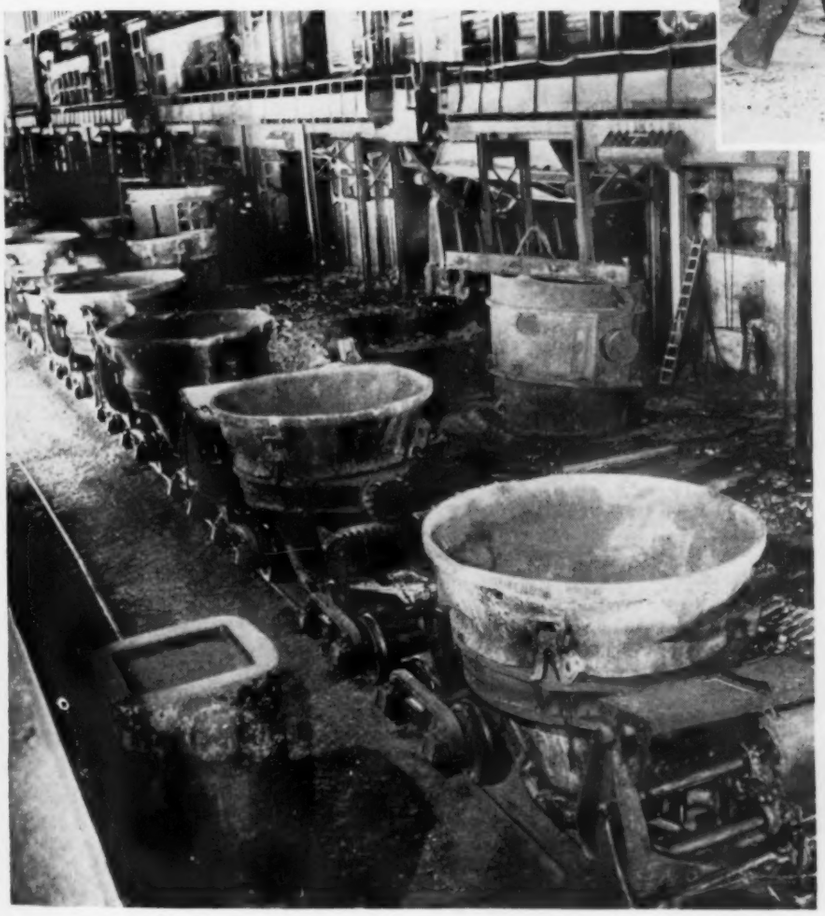
← SILENT: *Carnegie - Illinois Steel Corp.'s 100-in. plate mill is as silent as the cat looking for a mouse.*

BELOW

WORKING: *Henry Kaiser's Fontana, Calif., steel plant works under an 18½¢ an hr raise. Mr. Kaiser claims production records since raise was granted.* ↓

BELOW

EMPTY: *These slag buggies at Republic Steel Corp.'s Chicago openhearths show why the steel industry operates at 7 pct of capacity.* ↓



BELOW

BUSINESS AS USUAL: *Weirton Steel, with plants in Weirton, W. Va., and Ohio, operate under an independent steel union contract.* ↓

Sharon Steel Seeking Lease on Government Byproduct Coke Plant

Sharon, Pa.

• • • **Moving toward** more complete integration of the company's steelmaking facilities, Sharon Steel Corp. is seeking a lease on the government-owned byproduct coke plant at Morgantown, W.Va. While the negotiations are still in progress and the outcome is still uncertain, Henry A. Roemer, president of Sharon Steel, pointed out that a lease on this coke plant was considered just about the time negotiations commenced on the purchase of the Farrell Works from Carnegie-Illinois Steel Corp.

The 74 oven byproduct coke plant was built as part of the huge Morgantown Ordnance Works that was operated by duPont and by the Army for the production of ammonia. While it is the intention of the Army to keep the works in a permanent standby condition, the coke ovens were advertised for lease subject to future need by the Army.

Sharon is interested in leasing the plant so as to become independent from the standpoint of coke supplies. Presently, it has contracts with U. S. Steel Corp. for both coke and iron ore, the agreement providing that H. C. Frick Coke Co. supply the former commodity. These contracts were negotiated until Sharon could provide its own supply of these materials. A 5-yr lease on the coke plant is contemplated.

Operations at the newly acquired Farrell Works have progressed rapidly since the plant became part of Sharon Steel. If the steel strike hadn't occurred, January would have been the biggest month productive-wise in the plant's history. Weekly records were broken consistently in January up to the time of the strike.

It is expected that the old plant of Sharon Steel Corp., at Lowellville, Ohio, will be shut down permanently by the end of March, depending, of course, upon the duration of the steel strike. Some of the equipment is in the precess of being moved to Farrell Works and the remainder will be disposed of en masse or peace-meal, whichever method provides the greater yield. Speculation that the company still has in the neighborhood of $3,500,000 to pay in five equal installments to Carnegie-Illinois for the Farrell Works apparently is without foundation, since the purchase of the plant was strictly a cash deal and it was completely paid for when the plant was taken over. Sharon did borrow some $5,000,000 in 10-yr notes at 2 pct interest from two New York banks.

Despite the increased steel productive capacity of Sharon Steel Co., the company expects to use it all, leaving none for sale. It is estimated that the Farrell Works will be able to produce about 61-600 tons of semi-finished steel per month, all of which will be used by Sharon Steel Corp., and its subsidiaries, Niles Rolling Mills Co., and Detroit Seamless Steel Tube Co.

Sheet Bar Processor Liquidates Business

Pittsburgh

• • • **Stockholders of** Parkersburg Iron & Steel Co., Parkersburg, W. Va., voted on Jan. 14 to dissolve and liquidate the company, according to J. F. Budke, president. Mr. Budke declined to comment on the reasons for the company's decision to liquidate. It is believed, however, that the inability of the company to purchase sheet bars was the primary reason, with the prospect of increased labor costs on normally narrow profit margin operations contributing to the decision to abandon the enterprise.

Jones & Laughlin Steel Corp. was the chief source of sheet bars for Parkersburg, and the decision of J & L on Jan 1 to discontinue the sale of this commodity left Parkersburg without a source of supply. J & L, in fact, was the last supplier of sheet bars in this area, because Carnegie-Illinois Steel Corp. had sold its Farrell Works to Sharon Steel Corp. on Dec. 15, and from these works Carnegie supplied all its sheet bar customers. J & L discontinued the sale of this commodity for the two-fold reason that its ceiling selling price was less than cost and the steel going into sheet bars could be used by the company in other operations. (See THE IRON AGE, Dec. 13, 1945, p. 112.)

Parkersburg Iron & Steel Co. obtained the bulk of its sheet bars from J & L, all of which were delivered by river, and processed them into hot-rolled sheets, galvanized sheets, roofing and siding, stove pipe and other formed products. The company had an annual rolling capacity of some 36,000 tons and a galvanizing capacity of about 25,000 tons a year. It was formed in 1901, a West Virginia company, and the common stock outstanding on Jan. 1, 1945, totaled $800,000.

COMING EVENTS

Feb. 4-8—National Metal Congress and Exposition, Public Auditorium, Cleveland.

Feb. 4-8—American Society for Metals, Statler Hotel, Cleveland.

Feb. 6-8—American Industrial Radium and Xray Society, Hollenden Hotel, Cleveland.

Feb. 13-14—Steel Founders' Society of America, Annual Industry Meeting, Edgewater Beach Hotel, Chicago.

Feb. 25-28—Annual Meeting, American Institute of Mining and Metallurgical Engineers, Chicago.

Feb. 25-Mar. 1—Spring Meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh.

Mar. 5-6—Midwest Quality Control Conference, La Salle Hotel, Chicago.

Mar. 20-22—Production Show and Conference, Chicago Technical Societies Council, Stevens Hotel, Chicago.

Apr. 2-5—Packaging Exposition, sponsored by American Management Assn., Public Auditorium, Atlantic City, N. J.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 22-27—National Plastics Exposition, Grand Central Palace, New York.

Apr. 25-26 — Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace and Raw Materials Conferences, Chicago.

May 6-10—Golden Jubilee Foundry Show, American Foundrymen's Assn., Cleveland Public Auditorium, Cleveland.

May 29-31 — Machine Dealers National Assn., national convention, Claridge Hotel, Atlantic City.

June 3-5—American Gear Manufacturers Assn., Annual Meeting, The Homestead, Hot Springs, Va.

June 24-28—Forty-ninth Annual Meeting, American Society for Testing Materials, Buffalo.

Weekly Gallup Polls . . .

Union Labor Vote Still Strongly Democratic

• • • **Despite attacks on** the Truman administration by some labor union leaders recently, there is no factual evidence of any important defection from the Democratic party among the rank and file of labor union members throughout the country, according to George Gallup, director, American Institute of Public Opinion.

As things are today, if labor leaders do break with the Administration—as John L. Lewis broke with Roosevelt in 1940—it is extremely doubtful whether the rank and file of their members would go along with them at the present time. A survey of labor union members just completed by the institute shows that if a presidential election were being held today, virtually the same proportion of labor union members would vote Democratic as in 1944 or 1940.

Possibly events on the labor front in the next few critical months, especially the outcome of strikes now in progress, may turn union members sour on the Administration but their present attitude, as shown in the institute's coast-to-coast survey, would give little comfort to the Republican party or to anti-Administration labor leaders.

That President Truman is holding the labor union vote as well as Franklin D. Roosevelt did can be seen from the table shown below. From 1936 to 1944, Roosevelt dropped 8 pct among labor union voters at a time when he was losing 9 pct among all voters.

The question:

"If a presidential election were being held TODAY, which party would you vote for—the Democratic or Republican?"

Vote of Union Members Since 1936

	Dem. Pct	Rep. Pct
1936 Pres. Election	80	20
1940 Pres. Election	72	28
1944 Pres. Election	72	28
TODAY	70	30

Present sentiment among CIO and AFL voters:

CIO Members	Pct
Democratic	74
Republican	26
AFL Members	
Democratic	69
Republican	31

Although Democratic party leaders are going after Midwest farm votes this year with renewed intensity, all evidence to date shows that the Republican party is holding its own in the farm areas. The Democrats will have to turn some near-miracles if they expect to walk off with a majority of Midwest farm votes in 1946 or 1948.

Latest soundings of farm sentiment by the institute find that only slightly more than four farmers in every ten in the Midwest say they would vote Democratic if a presidential election were held today.

In the solid South it is a different picture, of course, with the Southern farmers still strongly Democratic, in fact, more Democratic now than they were in 1944.

Farm sentiment was measured in the following question:

"If a presidential election were being held today, which party would you vote for—the Democratic or Republican?"

The vote of farmers in the Midwest states—states which are of crucial importance in the electoral college—follows.

Midwest Farmers

	Rep. Pct	Dem. Pct
1936 Election	44	56
1940 Election	55	45
1944 Election	57	43
TODAY	58	42

The percentages represent the average for farm sentiment in the combined area of Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Kansas, Nebraska, North Dakota, South Dakota, Minnesota, and Missouri.

The Truman administration can count as usual, however, on a strong backlog of Southern farm votes. With the Southern farmers counted in, the picture of total farm sentiment is more favorable to the Democrats.

All Farmers

	Rep. Pct	Dem. Pct
1936	41	59
1940	46	54
1944	52	48
TODAY	49	51

Members Favor Democrats Despite Leaders' Criticism; Republicans Lead in Midwest

• • •

The increase in Democratic percentage this year as compared to 1944 comes about because of a rise in Democratic strength among Southern farmers. Whereas the vote among Southern farmers in 1944 is estimated at 66 pct Democratic, today the survey finds approximately three out of four Southern farmers favoring the Democrats if a presidential election were held.

This gain, however, is of no particular value to the Democrats in a presidential election, because increased strength in the solid South does not bring any increase in electoral votes.

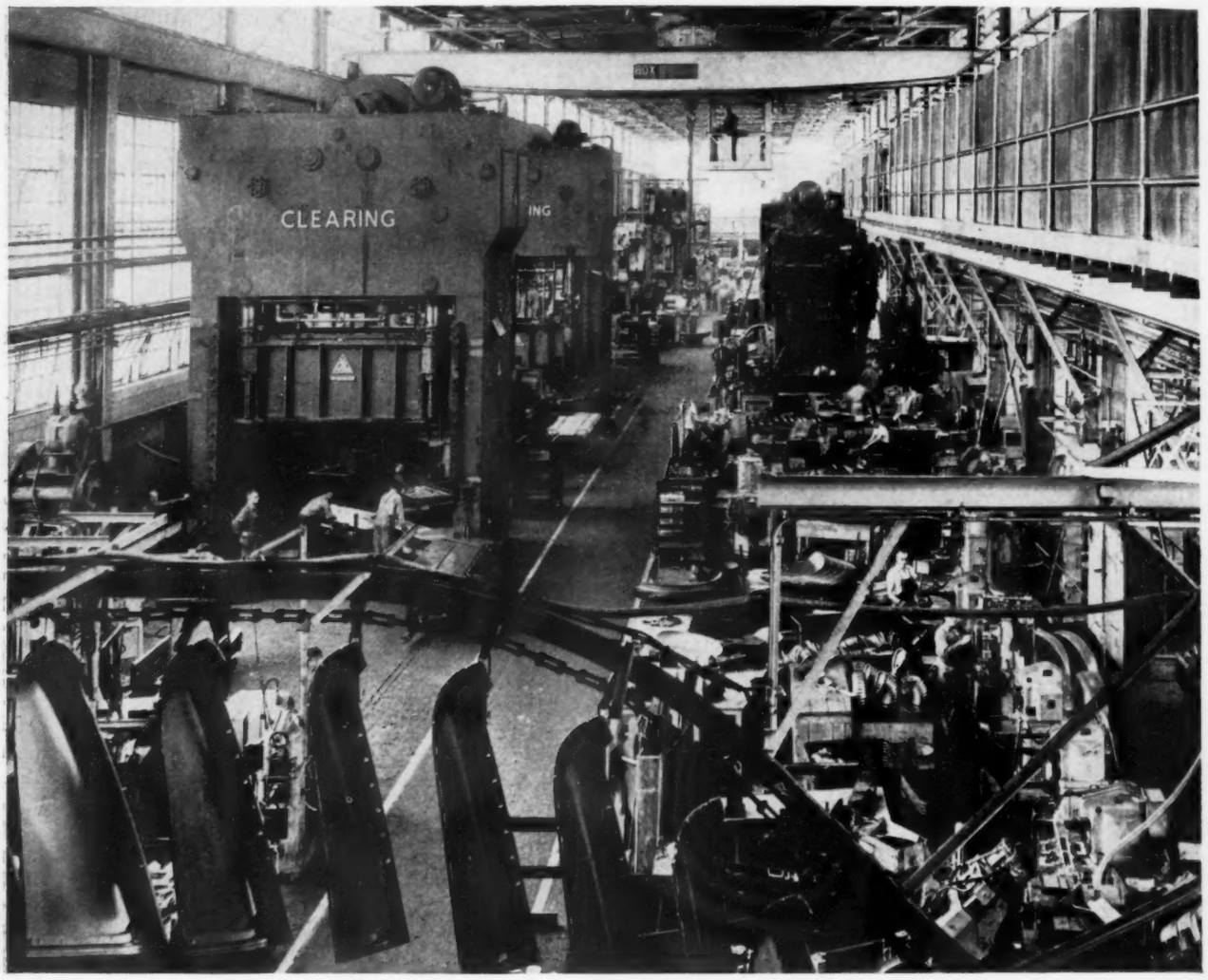
A relatively small Democratic gain in Midwestern states could yield much richer political dividends in an election year than a very substantial gain in states where a Democratic majority has always been assured.

The big problem for the Democratic party, in 1946 as well as in 1948, is whether the labor union vote will turn out at the polls on election day. If union members while in sympathy with the Truman administration, were apathetic or for some other reason did not take the trouble to vote in any substantial numbers at these elections, the effect on the Democratic party could be disastrous.

The severe setback which the Democrats suffered in the 1942 Congressional elections was due in large part to the low turnout of laboring groups on election day. The Political Action Committee of the CIO was organized principally to make sure that there was a full turnout of the labor vote in 1944 for Roosevelt.

One of the great delusions of American politics is that the rank and file of union members will follow their leaders as willingly

(CONCLUDED ON PAGE 122)



Stainless Steel Fabricator Expands Facilities

By JOHN ANTHONY

o o o

Philadelphia

• • • **The Heintz Mfg Co.** here, prominent metal fabricator and design engineer, has taken an additional 50 acres in which to expand its present plant site by nearly 100 pct. The addition of new equipment and new manufacturing techniques is already in process in some of its present buildings, and new construction is contemplated in the newly acquired area.

The firm is well known for its unique modifications of accepted production techniques in order to obtain an improved product at low cost and in larger quantities, especially during the war. Stainless steel, with its high strength-to-weight ratio and excellent corrosion and heat resistant qualities, has been found by Heintz to possess significant advantages and has long been used in its production until the Army and Navy found it necessary to limit consumption of products containing nickel and chromium in order to make the supply of these metals go around. Now Heintz officials foresee a return to the large scale use of these alloys and estimate their consumption during the next few years to be more than 1000 tons per yr, principally in sheet and bar form. From these they fabricate other shapes required. Heintz has pioneered in replacing heavy castings and forgings with lightweight sections built up from ribbed and reinforced stainless sheet.

Heintz's long experience in the fabrication of stainless has permitted the development of techniques for fabricating these alloys economically and with assurance. In forming the metal Heintz largely employs bronze or chromium-plated steel dies in order to prevent any possibility of embedded steel particles in the stainless which result in corrosion. These dies are likewise designed so that deep drawing may be done in one operation without the necessity for annealing and pickling operations. Subsequent refinishing of surfaces is almost eliminated.

The ingenuity of the engineering staff is apparent in certain of the novel experiments developed in mass production techniques. In the stainless steel stacks produced for the Navy, it has been customary for a fabricator to lay down the bottom annular section and weld on succeeding sections, the operators working higher and higher on

scaffolding as the stack went toward completion. Heintz reversed this procedure by building a jig to act as rigging support and laying down first the top section and adding lower sections at ground level. Thus welding equipment and operator are always conveniently located and it is possible to employ motor-driven easily-positioned welding equipment.

In a production line of heavy presses, stampings move down the line from die to die in an appropriate sequence. In the case of certain large stampings which must be handled by three or four men as they progress, some of the big presses have merely been laid over on their sides in a steel cradle in order to permit easy manhandling of stampings.

Heintz also works with extruded aluminum sections and has taken out patent rights on an interesting technique for the assembly of a railway car door from hollow extruded sections fitting together by a tongue-and-groove arrangement and spotwelded. Since these doors are made up sectionally, it is possible to produce them in a variety of widths. The doors are light but have considerable strength and rigidity. For use on stainless steel trains Heintz welds on a thin facing of stainless steel. Such doors have been bought by one of the leading car builders and will be made available to others. Heintz is also producing 4-leaved, extruded aluminum bus doors.

There has been some evidence of opposition to the use of mild steel for the huge gas tanks used by inter-city buses, and, anticipating possible action by the Interstate Commerce Commission, Heintz is making large tanks of light gage stainless sheet with formed ridges for dimensional stability.

In making textile processing tanks of special design, Heintz is attempting to serve an industry in which millions of dollars are said to have been lost in the value of textiles destroyed by the accumulation of residues in joints and in tanks with smaller bend radii than required for easy cleaning. Made of stainless steel, the Heintz textile processing and dyeing tanks offer many advantages to the industry. The same considerations are involved in Heintz-built stainless steel beer tanks and vats, and water tanks.

Products made by Heintz for the Army and Navy during the war include the large hangar hatch covers of stainless steel used on aircraft carriers, many other types of hatch covers, stainless bulkhead doors of a variety of designs, multiple rocket launchers of extruded aluminum or a fabric-containing plastic, and ships' ladders having extruded aluminum steps with abrasive inserts to prevent slipping. The latter product is being marketed for postwar use. Many of these ordnance requirements will continue to be supplied to Army and Navy but will, of course, no longer constitute the major part of the firm's production.

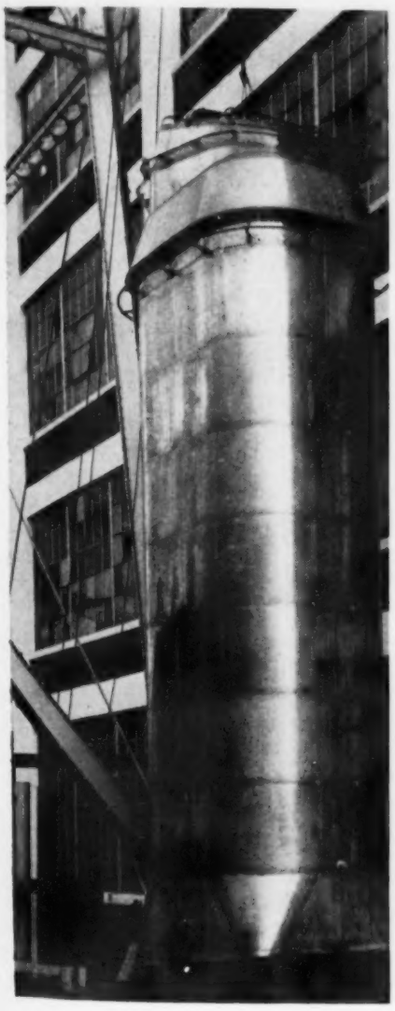
In a statement to employees it has been announced that the firm intends to manufacture components for household and commercial refrigeration, bottle coolers and other dispensing units, as well as washing machine components. In the automotive field, Heintz is supplying manufacturers with numerous stampings for truck and delivery wagons and will continue to supply a large manufacturer of pleasure automobiles with body units and stampings in addition to replacement parts in large quantity.

The company's capacity for auto body work has been doubled. Ingenious use of steel is being made for the fabrication of scores of items such as radio chassis stampings, lighting fixtures, etc.

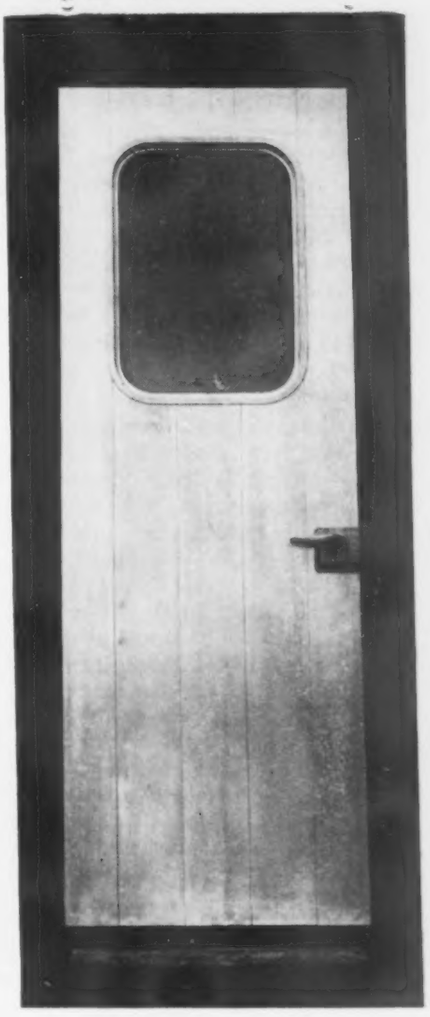
A research and development division of the company, set up in new quarters and equipped with a unit of heavy presses and subsidiary equipment, is engaged on long time programs of sheet metal research for key industrial concerns —including aircraft producers.

The company expects to engage

NEW TECHNIQUE: *Fabricating a stainless stack by elevating completed upper section in a jig and spotwelding additional sections at ground level.*



ASSEMBLED RAIL DOOR: *Extruded hollow aluminum sections, assembled by a tongue and groove arrangement and spotwelded, make up the door.*



in export activities which are now under the direction of Weber deVore, manager of marine and foreign sales. Having recently returned from a trip to Europe, Major deVore feels that the British nationalization of industry program is a factor that must be reckoned with by American industry. He has said that "It is in the interest of the United States to extend large loans to Britain and France, for we must see to it that their industries be continued in production, just as good business men would do for any distressed customer in this country. The United States is on the threshold of a great era in international relations. We have the major responsibility for whatever takes place in the future. We must take our place in the leadership of world affairs."

Although the company is closely controlled, profits have been liberally shared with its employees, with only a small proportion of its income devoted to dividends to the stockholders.

Reconversion Delayed in England

London

• • • **Reconversion progress** as reported recently by the Board of Trade is generally considered here as developing much slower than was expected. Progress is said to be maintained during the last months of 1945, but the shortages of some materials are said to be retarding the expansion as planned.

Steps taken recently by the Ministry of Labor are expected to relieve the shortage of labor that has been hampering light foundry production.

Production of passenger cars is improving, but very slowly. The five principal car makers had produced 6812 units by the end of November, but the upward production curve is scheduled to get steeper month by month. Hopes for 1946 call for the production of 470,000 passenger cars, 135,000 trucks and 12,000 buses.

Textile and printing machinery firms are starting their second 6 months of production under a bulk licensing scheme. The overall export percentage for printing machinery is 22 pct against a planned 33 pct, while 52 pct of the textile machinery produced in the last 6 months in Britain has gone to the export drive. This is against a schedule of 71 pct for export.

Licenses issued for the production of radios cover 878,000 sets for the British domestic market and 489,000 for export. Actual production of sets under the new production program through October was 18,550 sets, of which 1382 were exported.

Production of bicycles for the third quarter of 1945 totalled 244,977 and 193,400 units of parts, compared with 20,500 bicycles and 193,000 units of parts in the second quarter. The 1946 program calls for the production of 1,500,000 cycles for the export trade and 1,000,000 for the domestic market.

While production of aluminum hollow-ware has been on the upswing, enameled ware output is decreasing slightly due to supply difficulties.

GUN CONVERSION: *This 12-ton section, built as a gun emplacement for the might-have-been aircraft carrier* U.S.S. Reprisal, *is now on its way to Bethlehem Steel Co.'s plants in the East for fashioning into peacetime products.*

November Steel Ingot Production in Canada Registers Small Gain

Toronto

• • • **Canada's production** of steel ingots and castings registered a small gain in November at 207,981 tons or, 68.8 pct of capacity and compares with 205,846 tons in October, or 68.1 pct, and with 269,923 tons for November 1944. The month's output included 200,932 tons of steel ingots and 7049 tons of steel castings.

For the 11 months ending with November cumulative production of steel ingots and castings totaled 2,662,042 net tons, which is a decline of 4.2 pct from the total of 2,780,928 tons in the corresponding period of 1944 and compares with 2,769,156 tons in the like period of 1943.

Charges to steel furnaces during November included 98,515 tons of pig iron; 60,365 tons of scrap of consumers' own make, and 69,641 tons of scrap purchased. For the 11 months of the year, steel furnace charges included 1,288,468 tons of pig iron, 801,072 tons of scrap of consumers' own make and 784,678 tons of purchased scrap.

Following are comparative monthly totals for production of steel ingots and castings during 1945 in net tons:

	Steel Ingots	Steel Castings
January	253,674	15,048
February	235,602	14,862
March	261,524	15,937
April	260,144	14,069
May	254,629	13,014
June	244,792	12,323
July	220,379	8,782
August	214,930	9,998
September	189,640	8,868
October	198,185	7,661
November	200,932	7,049
Total	2,534,431	127,611

Assn. Elects Officers

New York

• • • **At the annual** meeting of the Forging Manufacturers' Assn., held recently in New York, R. B. Heppenstall, president of Heppenstall Co., Pittsburgh, was elected president of the association for 1946.

George L. Street, Jr., president of J. R. Johnson & Co., Richmond, Va., will serve as first vice-president, Alex Lumsden, vice-president of Ajax Steel & Forge Co., Detroit, as second vice-president, and W. J. Parker of New York, secretary-treasurer.

German E-Boat Turbine Propulsion Design Revealed

New York

• • • **The Office of** the Publication Board, Dept. of Commerce, recently released for publication a report on the M. A. N. (design offices at Harburg, Germany) project for a gas turbine propulsion unit for E boats.

The proposed layout of the 7500-shaft hp gas turbine propulsion unit designed by the M. A. N. organization is illustrated in the sketch, fig. 1. In this unit, a single axial compressor is directly coupled to a turbine of sufficient power to drive the compressor only, with an annular combustion chamber between the two. Air from the compressor is delivered to both the combustion chamber of this turbine and to the combustion chamber, also of annular type, of a second turbine on a separate shaft. This is the power turbine and drives the propeller shaft through a reduction gear.

The power turbine was to have run at 6000 rpm with a maximum inlet gas temperature of 800° C. The reduction gear box reduced the speed to 1000 rpm on the propeller shaft. The expected overall thermal efficiency from this unit was 25 pct. The German source of this information was unable to remember the efficiency figures used in the design for the compressor and turbines, or the number of stages in these units.

In fig. 2 are shown the physical properties of Krupp's "Tinidur", the steel intended for use in manufacture of the turbine blades.

At the time of the capture of the district, this design office had the design of the compressors and turbines about 50 pct completed, and was engaged in the design of a gas turbine plant for a 12,000 kw generating plant to use producer gas as fuel.

The proposed layout of this unit comprises four axial compressors in series, with intercooling between them, compressing air to 20.1 atmospheres pressure and delivering it through an exhaust heat exchanger to two combustion chambers in parallel, each supplying gas to one of the two turbines which drive the third and fourth compressors. The combined exhaust from these two turbines passes to a third combustion chamber where it is reheated before entering the turbine driving the first two compressors. From this turbine the exhaust passes to a fourth combustion chamber where it is again reheated and delivered to the turbine driving the generator. The exhaust from the turbine passes to atmosphere through the heat exchanger, (see sketch below.).

The first two compressors were intended to run at 4600 rpm, the third, fourth and fifth at 9000 rpm, and the power turbine at 3000 rpm.

Air for the gas producer is tapped off the delivery from the fourth compressor and is further compressed in a compressor driven in tandem with the latter to 21.1 atmospheres pressure. It is delivered to a heat exchanger where it is heated by part of the exhaust from the power turbine, and has water added to it before passing to the gas producer. The gas producer was to have been designed and made by the Lurgi Gesselschaft fur Warmetechnik of Frankfurt-am-Main and was to use brown coal.

The designed effectiveness of the exhaust heat exchanger was 80 pct, and the expected overall thermal efficiency from the plant, excluding the gas producer, 35 pct. The maximum gas temperature was to be 700° C, and Krupp's Tinidur steel was to be used for the turbine blades.

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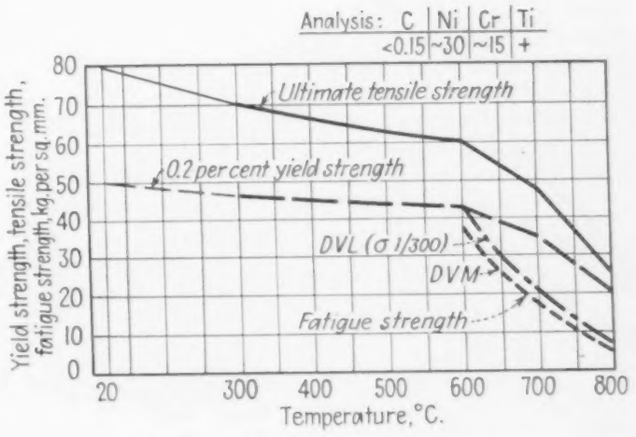

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FIG. 2 — *Physical properties of Tinidur steel as affected by temperature.*

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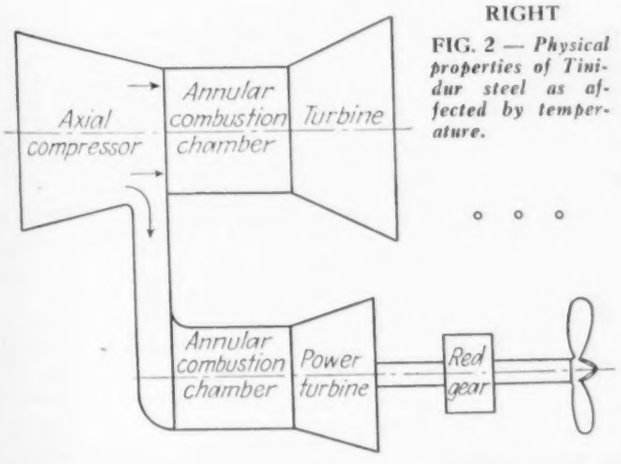

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FIG. 1 — *Schematic drawing showing layout of proposed gas turbine propulsion unit for E-boats.*

1945 British Steel Exports High

London

• • • **Effect of the extra** victory holidays in the third quarter of 1945 on United Kingdom steel production was shown in statistics recently published by the British Iron & Steel Control. Following the holidays and the normal seasonal decline of the third quarter there has been a strong recovery in steel production, within the limits of available fuel and power. Production during the last quarter of the year ran at an average rate of 1.0 million long tons more than the prewar average year. (1935-38).

The summary of production in Britain disclosed that following the cessation of lend-lease shipments at the New Year, imports fell off sharply and recovered only slightly with the shipment of some tonnage of semifinished steel from Canada and Australia.

Exports during 1945 amounted to approximately 750,000 long tons of finished steel, and are expected to rise further in the first months of 1946. The export figure is considered to be particularly high by the Control in view of the fact that two important sections of the export industry tinplate and sheet, have been unable to participate in the export drive to any great degree. The absence of any considerable export shipments from these branches of the industry is explained by the Control as due to a shortage of labor. Shipping difficulties, due both to a shortage of vessels and the autumn dock strikes are also said to have delayed export tonnages in the last quarter of the year. Table I indicates that although the export drive did actually start in the first months of 1945, tonnages shipped before June were negligible.

According to the Iron & Steel Control, "A continuance of this expanding export cannot be achieved unless a considerable improvement takes place in shipping and better inland transport services are available. Large quantities of steel have been held up for months now awaiting shipment. The dock strike aggravated the position materially. Opportunities for shipment are still so limited and irregular that there is bound to be a good deal of hesitation over expanding exports until an improvement takes place."

The statement further reveals that the value of the exports at current prices for 1945 was approximately £14,000,000 ($56,000,000).

The special efforts being made by the British industry to allocate existing supplies of steel so as to enable producers to resume normal relations with their regular customers are recognized in the statement, and it is also noted that where available excess materials are being used to develop new customers. The urgent necessity for imports of a limited supply of semifinished material is also mentioned.

The figures given in Table II relating to the present order book conditions in British mills show the changes that have occurred in order book distribution following the end of the war. According to the Control statistics whereas a year ago the Services & Supply Depts. were responsible for 71 pct of the outstanding orders at the end of the eighth week of the fourth quarter, they were responsible in the corresponding period of 1945 for only 36 pct. Other notable changes are the increases in the Board of Trade items, especially direct exports, Ministry of Works, and the Petroleum Div., most of which is intended for export.

TABLE I
Supplies and Consumption of Steel
(000 gross tons per annum: ingot equivalent)

Period	Home Production	Imports	Total Available	Total Deliveries	Export	Home
Average 1935-38	11,257	1,244	12,501	12,482	2,438	10,044
1943	13,031	2,773	15,804	16,005	122	15,883
1944	12,142	1,668	13,810	14,328	240	14,088
1945*	11,808	176	11,984	12,568	676	11,892
First Quarter	12,127	413	12,540	13,292	188	13,104
Second Quarter	11,815	17	11,832	12,679	394	12,285
Third Quarter	10,990	74	11,064	11,639	824	10,815
Fourth Quarter*	12,300	200	12,500	12,660	1,200	11,460

* Partly estimated.

TABLE II
Order Book Position
(000 gross tons)

Department	Orders on hand: End of eighth week of fourth quarter	
	1944	1945
Supply	1,004.9	579.6
Admiralty	307.0	206.5
Aircraft Production	189.3	44.7
War Office	54.8	30.9
Air Ministry	10.6	8.9
Sub-total (1)	1,566.6	870.6
War Transport	179.3	188.1
Works	40.9	89.1
Food	60.1	43.6
Fuel & Power:		
Coal Div.	93.0	107.1
Petroleum Div.	22.0	162.1
Board of Trade:		
Home requirements	42.9	128.0
Indirect exports	29.3	120.7
Direct exports	76.8	587.7
Other departments	77.9	113.0
Sub-total (2)	622.2	1,537.4
Total	2,188.8	2,408.0

British Gages on Display

London

• • • **British gages** and measuring instruments developed during the war are being displayed in London by Alfred Herbert, Ltd., Coventry, England in a private exhibition at their offices. Prewar distributors of several lines of German-made gages, Mr. Herbert is now handling their British successors.

The display includes a line of Hilger projectors for all types of shop work, Edgwick hardness testing machines, and a line of precision comparitors and indicator gages built by Smith Meters, Ltd.

Transport Aircraft Sales Head List of Surplus Disposals in Europe

London

• • • **Surplus transport** aircraft are among the most easily sold surplus items being disposed of by the Office of Foreign Liquidation Commissioner in Europe. The sale of 10 C-47A Douglas transports to the Netherlands government for KLM airlines use is one of the most recently announced transactions. Other sales include trainer as well as transport aircraft, trucks, railroad equipment and transport supplies, and assorted relief supplies.

The sale of C-47A's took place early in January, and followed shortly after the announcement of a leasing arrangement on 14 C-54 long range transports to the Netherlands government, which will make the craft available for traffic between Amsterdam and Batavia, in the East Indies. The lease makes the craft ready for immediate use at a rent equal to the normal write-off rate, while the U. S. government retains title to the planes. The Netherlands government retains the option for outright purchase at any time during the life of the lease. The contract is for an 18-month period for the 14 craft at a rate of $15,000 each, or $315,000 for the group. Deliveries have already started.

Twenty-eight transports and training planes have been sold to Norwegian, Swedish, and Irish authorities for $298,000. Negotiations are also reported by the OFLC with 6 other foreign nations for surplus transport craft. Before any craft are offered for sale for commercial use, they are first declared surplus to air forces requirements in all parts of the world.

Aer Lingue (Irish Airlines) bought three C-47's at $25,000 each; Swedish Aerotransport, one C-47 at $25,000, and one C-53 at $60,000; and Norway, 23 advanced trainer planes to be used in rebuilding her air force at a cost of $138,000. The sale price is determined on the basis of age, general condition, flying hours and the supply of the type available.

The C-47's originally cost the U. S. government an average of $127,000 each; C-53's, an average of $142,000 each; C-54's an average of $425,000 each (4 engines); and the trainers an average of $27,000 each.

The craft sold are from a preliminary group of 153 such craft that are the first to be declared surplus in the European Theatre. All such aircraft are at present being stored in OFLC's central marketing place at Hanau, in Germany. Noncombat planes to be disposed of in the ETO are expected to total 1400, ranging from the four engine transports to single seat liaison craft.

Surplus and obsolete combat craft are being scrapped and salvaged at Industrehafen, Eschweigen and Landsberg fields in Germany. Although the current opinion in the OFLC is that there is virtually no market for these craft, small numbers are being retained for possible sales to friendly nations wishing to rebuild their air forces. A similar project started in Britain was belatedly halted when it seemed possible that some sales might be made, but about 80 pct of the craft had already been scrapped when the stop order went out.

Sales outside the aircraft line consummated by the OFLC cover such items as redeployment camps, sold intact to the French government; 10 million ft of wire and sisal rope to Netherlands along with 4 million lb of nails, and quantities of hand tools numbering in tens of thousands; cranes to France ranging from 2 to 27 tonners; and 45,000 tubes of a gas repellant impregnite for shoes, which is destined for use as a fuel substitute.

Sales are being carried on under various plans, with the basic concept established for the Foreign Liquidation Commissioner being that sales were to be conducted on a dollar sales basis. Every effort is being made to get basic relief supplies to the needy countries as quickly as possible, as relief experts foresee that one truck in use today is worth ten delivered next summer. A modification of the basic sales-for-dollars plan has been worked out which is being used by the Netherlands and Italy. After a plan had been drawn up in Washington all the governments were given the opportunity to buy specified amounts of U. S. surplus goods paying for them in their own currency. The proviso was that they should agree in advance to negotiate the exchange rate at a later date. Only the Netherlands and Italy chose to take advantage of the offer and shipments are currently being made to those countries and are being paid for in lira and in guilders. French purchases thus far have been paid for in dollars.

Among the list of miscellaneous "urgently needed" items which have been bought by the French are eight former U. S. Army redeployment centers in the Rheims and Mailly-le-Camp areas, which were purchased for $2,000,000 on an "as-is, where-is" contract. It is understood that the majority of the camps will be dismantled and parcelled out by the French Reconstruction Ministry to house POW's now at work in France.

The camps were each constructed to handle an overstrength U. S. Army division at a time, and the eight camps have an aggregate capacity of 130,000 persons. Prefabricated structures included are destined to be distributed throughout France to house homeless Frenchmen. The camps were closed out by the army when redeployment centers were shifted.

Supplies being sold by the Commissioner to the United Nations Relief and Rehabilitation Administration include medical supplies, (several complete 1000 bed hospitals have already been shipped) and the requisites to reestablish a skeleton transport system for Poland, Czechoslovakia and Yugoslavia. Included for Poland are 75 locomotives, 2500 box cars, 2600 army trucks, and 3000 trailers, spare parts and tires, road repair machinery and farm tools.

Czechoslovakia has been allotted $6,700,000 of UNRRA supplies, which are moved by rail and truck convoy over the 750 mile route from the depots in France and Belgium to the Czech frontier.

Other UNRRA purchases include locomotives, tractors, and a 1000 bed hospital bought for Yugoslavia for $3,658,880, locomotives and steel for Greece at $288,128, and $920,086 worth of trucks and sleeping bags.

OWMR Sees Supply-Demand Inbalance as Economic Threat

Washington

By DAVE ANSBORO

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• • • **No matter what production** levels are attained in 1946, accumulated demands will greatly exceed supplies of many materials and products with the consequent danger of inflation threatening the stability of the entire American economy, according to the fifth report of the Office of War Mobilization and Reconversion submitted to Congress Jan. 21.

Although anticipating a serious deficit of flat-rolled products because of heavy demands from consumer durable goods industries and a continuing shortage of workers, the report states that these shortages should be eased somewhat by April or May. While total production of sheet and strip is not expected to increase materially, production in certain sizes and gages is being expanded in order to ease the situation.

Unless reduced by labor-management strife, the report estimates that rate of steel operations during 1946 will be near 85 pct of the current ingot capacity of over 95 million tons. Effective steel product capacity in privately owned plants, after allowing for manufacturing losses, elimination of special war production facilities, retirement of obsolete furnaces, plant renovation and decline in steel castings output, should be over 60 million product tons in 1946 compared with 49 million tons in 1940 and peak production of 67 million tons in 1944.

Total steel demand is expected to approximate capacity unless reconversion is further retarded. The report points out that capacity for certain steel products may be increased during 1946 by further purchase or lease from the government of facilities built and operated for war purposes.

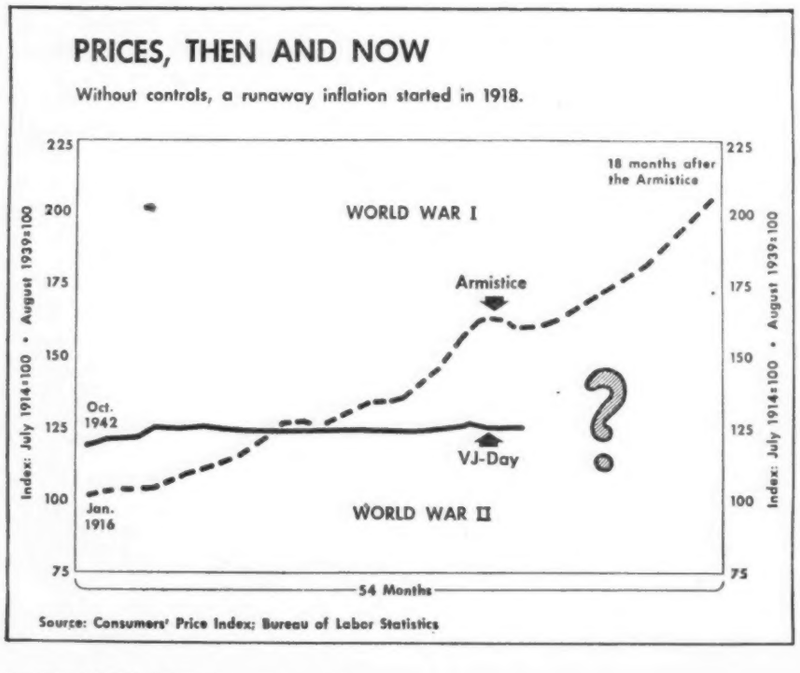
Considering the long-term adequacy of steel supplies, the report declares that the future is uncertain. Rates of production necessary to maintain desired employment levels after 1946 will probably require consumption of considerably more steel in construction, capital goods and in the consumer goods industries than were required during 1946. Unless the capacity of the steel industry is expanded during 1946-47, it was pointed out, a bottleneck may result which will retard increased production to full employment levels.

With regard to aluminum, 1946 estimated requirements are expected to total well under one billion lb. Although ingot capacity is more than double current peacetime demand, the report states, a shortage of fabricated aluminum may delay production in some industries. Many of war-created facilities are not adaptable for peacetime production, and workers formerly employed in aluminum plants have drifted away to other localities where they have taken other employment. According to OWMR, the shortage of basic aluminum fabricated forms and shapes may persist well into 1946.

Commenting on the total supplies of copper and brass in 1946, the report declares that availability of sufficient quantities depends to a large extent upon availability of labor in domestic mines and in fabricating plants and, also, upon policies to be followed with respect to imports and consumption of reserve stocks. Whether the current level of copper production estimated at between 700 and 800 thousand tons a year is maintained, depends partly on availability of labor in mining and smelting and, in addition, subsidy and price policies. The difference between domestic production and requirements during 1946, the report states, can be made up by drawing on large wartime inventories and stockpiles and by continued import activities. This 1946 deficit, according to OWMR, will amount to several hundred thousand tons.

Tin controls should be continued during 1946, it is recommended, due to uncertainties existing with respect to Far Eastern supplies. Consumption of pig tin, the report says, probably must be limited to three quarters or two thirds of normal consumption.

Lead requirements during 1946 are expected to be about 50 pct above prewar consumption of 700 to 800 thousand tons annually but since supplies will be below peak wartime levels, not all demands



will be met. Antimony will also be in short supply, the report states.

A four point program recommended by the report calls for the following:

(1) Private industry must maintain production at high levels and increase production of critical types, shapes and sizes if metals are not to be a limiting factor in expansion of output and employment.

(2) The government must continue to assist industry in breaking bottlenecks and in taking price or subsidy action where needed to increase production of critical items.

(3) The government must continue to assure adequate imports of certain scarce metals, particularly copper, tin and lead.

(4) Controls over use and distribution of those metals which remain in short supply must be continued throughout 1946.

Construction machinery, farm machinery, transportation equipment, tools and other capital goods which were produced throughout the war are, according to the report, now being produced for the most part at and above prewar levels. Transportation equipment output is expected to go up after work-stoppages are over. Freight car production will continue at high pitch but the outlook for passenger coach production is not too bright due to component shortages and scheduled production of troop sleepers in 1946.

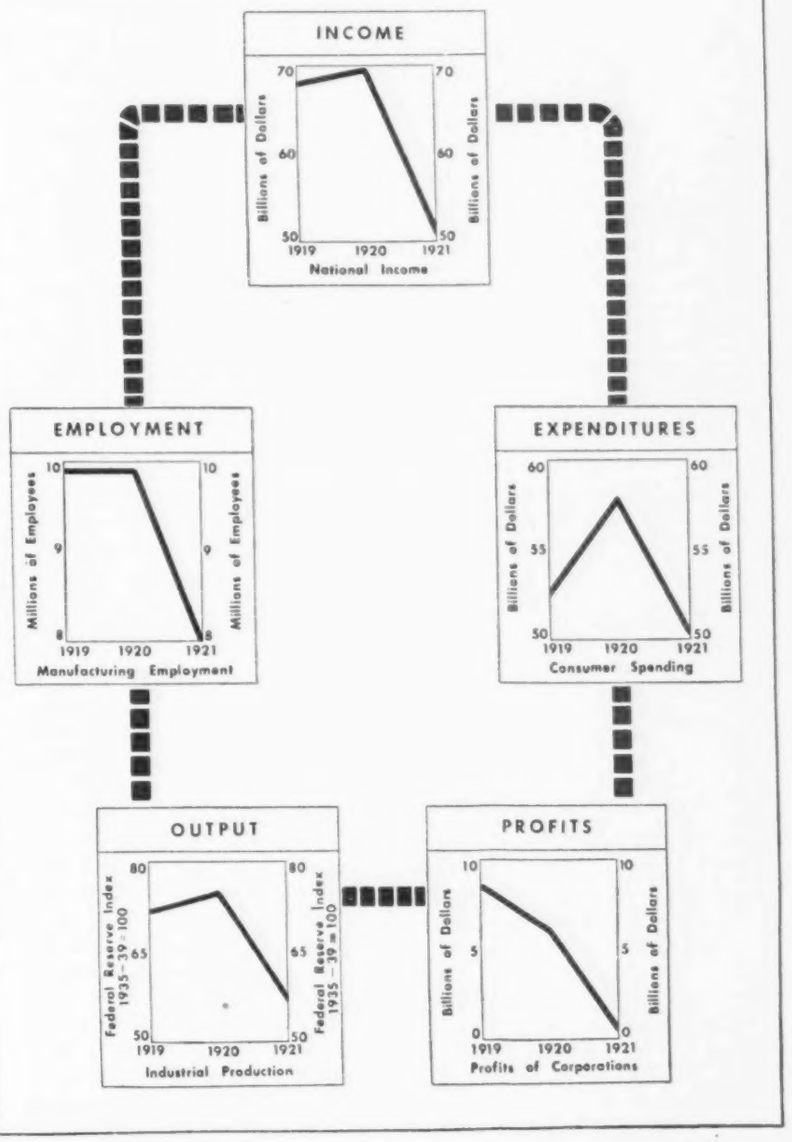
The report strongly recommends continuance of price controls beyond June 30, 1946. Conditions during the remainder of the transition period will be so spotty, the report declares, that only direct price controls which can be retained or lifted as required will cope with the situation. Price controls remain our only bulwark against inflation until production can be increased sufficiently to balance demand, it is pointed out, since rationing and allocations controls have been removed. The report emphasizes the fact that should the public realize that price controls will end June 30. compliance and enforcement activities would deteriorate long before that date.

Unemployment which had risen very slowly during October and November only to increase toward the end of 1945, may reach a peak in early spring, it was stated, but should be below former estimates. Some of the forces which have tended to keep unemployment at low levels heretofore but which will no longer be effective, the report says, are temporary withdrawal of veterans from the labor force; retirement of overage workers and married women from the labor force; inclination by reconverting industries to freeze production forces at present levels; and the slackening off of hiring by trade and service industries.

Tax legislation in 1946, Mr. Snyder says, will probably determine the pattern of the federal tax structure for a considerable postwar period. Legislation concerning public works and housing will lay the basis for postwar policies of great importance to the country, it is declared. The course of international trade, it is added, will be profoundly affected by congressional action on foreign loans and trade practices. The report urges enactment of the 65¢ per hr minimum wage bill now pending and also recommends enactment of the full employment bill in the form asked by the President.

BOOM AND COLLAPSE

When downward spiral starts, all sections of the economy suffer.



Industrial Briefs...

• STEEL FIRMS MERGE—A. M. Castle & Co., Chicago, has taken over the Gibbs Steel Co., Milwaukee, formerly operated as a subsidiary, with no change in the Gibbs' management, George Gibbs remaining as chief executive.

• EXPANDING—A 500 pct increase in factory and office space has been announced by Techtmann Industries, Inc., at their new location after Feb. 1 at 714 West Wisconsin Ave., Milwaukee.

• NEW ADDITION—The Kaydon Engineering Corp., Muskegon, Mich., is making an addition to its McCracken St. plant. Work has already been started and will involve about 12,000 square feet of floor space. Kaydon has purchased considerable additional machinery and expects to complete the work in February.

• NAME CHANGE—Stockholders of Eureka Vacuum Cleaner Co. have approved the change of the company's name to The Eureka Williams Corp., representing the combined operations of the Eureka and Williams divisions established following the merger of Eureka with Williams Oil-O-Matic Heating Corp.

• ACQUISITION — Barium Steel Corp., Canton, Ohio, has announced plans to acquire control of Republic Industries, Inc., which operates plants in Cleveland, Detroit, Pottstown, Pa., and Toronto, Canada, manufacturing stampings for the automotive, marine and aircraft industries and hydraulic equipment.

• NEW DIVISION—Ford Motor Co., Dearborn, Mich., has established an industrial and marine division to handle sales of Ford engines and parts to users in the indicated fields.

In charge of the division is Earl Severson, formerly with the Ford parts and accessories division, and known to marine engine builders through past connections with McQuay-Norris Co.

• BUYS RFC PLANT—National Carbon Co., Inc., a unit of Union Carbide & Carbon Corp., has completed negotiations with the RFC to purchase the Army Signal Corps battery manufacturing plant at Charlotte, N. C., for conversion to civilian operation. Civilian operation will employ between 500 and 1000 workers.

• NEW ASSEMBLY PLANT—Ford Motor Co. has begun construction of its new assembly plant and sales parts branch at Atlanta, Ga., a portion of the company's postwar expansion program, which was recently enlarged to $200 million. Production will be started within a year at the new plant. The plant will provide employment for 1800 persons. All structures are one-story steel framework.

• APPROVES LEASE — Approval of a lease offered by the General Motors Corp., Fisher Body Div., for the plant operated by the General Machinery Corp., Hamilton, Ohio, has been announced by the RFC. The plant was used during the war for the manufacture of marine steam engines for the Maritime Commission. General Motors plans to use the building for the temporary storage of heavy machinery during construction of a large stamping plant which will employ about 3500 men.

• NEW FOUNDRY—The Whitewater Centrifugal Casting Co. has been organized at Whitewater, Wis., to specialize in all types of nonferrous bushing, gears and similar products.

• STOLPER EXPANDS — Stolper Steel Products Co., Milwaukee, has purchased an extensive tract on the upper Milwaukee River from the Milwaukee Cement Co. to be used as a site for future expansion.

Construction Work On Rolling Mill Halted

Detroit

• • • **The outbreak of** the nationwide steel strike revealed a hitherto confidential expansion project being carried on at the Ecorse (Mich.) plant of Great Lakes Steel Co.

Being built at the plant was a million dollar cold rolling mill expected to add considerably to the finishing capacity of the company. One statement was that 2500 new jobs would be created when the new mill goes into production, on top of the corporation's present payroll of 7100.

Work on the new cold rolling mill was halted when construction workers of the American Federation of Labor refused to cross the picket lines of the CIO United Steel Workers Union. Several hundred AFL workers were employed on the building project. A spokesman for the construction workers union said the stoppage was not a sympathy strike and could be ended at any time by agreement between the corporation and the steel workers.

Gallup Poll

(CONTINUED FROM PAGE 113)

on political party preference as on labor union matters.

A classic example was the action of John L. Lewis in 1940. Mr. Lewis, then head of the CIO which he had created, announced shortly before election day that if Mr. Roosevelt were re-elected he would resign the presidency of the new and powerful union.

This move to swing the rank and file of CIO members away from Mr. Roosevelt and the Democratic party was a conspicuous failure. While the union members respected Mr. Lewis' leadership on labor matters, they were unwilling to go along with him on political matters.

A survey by the institute directly after the 1940 election found that a higher proportion of CIO members voted for Roosevelt than AFL members, although most AFL leaders had endorsed Roosevelt all during the campaign. Members of both unions were for Roosevelt however; the AFL vote was 71 pct Democratic, the CIO 79 pct.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

11,000 Tons, Chicago, intercepting sewer, Sanitary District of Chicago, to Commercial Shearing & Stamping Co., Youngstown.

2700 Tons, Saginaw, Mich., addition to foundry building for Chevrolet Gray Iron Foundry Div., General Motors Corp., to American Bridge Co., Pittsburgh.

2400 Tons, Pontiac, Mich., cafeteria for Pontiac Motor Div., General Motors Corp., to Whitehead & Kales, Detroit.

2084 Tons, Oceanside, Calif., eight Navy storehouses, through U. S. Navy, to Bethlehem Pacific Coast Corp., San Francisco.

2000 Tons, St. Louis, U. S. Steel Supply Co., Warehouse, to American Bridge Co., Pittsburgh.

1200 Tons, Los Angeles, Fruehauf Trailer plant, through Collins Construction Co., to Bethlehem Pacific Coast Corp., San Francisco.

1000 Tons, Westfield, Mass., housing project for Anchorage Homes to Bethlehem Steel Co., Bethlehem, Pa. through J. R. Worcester & Co., Boston engineers.

816 Tons, San Mateo, Calif., Bay Shore Freeway overcrossing, California Div. of Highways, through Macco Construction Co., to Judson-Pacific-Murphy Corp.

600 Tons, San Jose, Calif., refinery for International Metals Co. to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston Engineers.

600 Tons, Wapello, Iowa, state highway bridge, to Clinton Bridge Co., Clinton, Iowa, through A. Olsen Construction Co., Waterloo, Iowa, contractor.

500 Tons, Crawfordsville, Ind., addition to R. R. Donnelly & Sons Co., plant, to American Bridge Co., Pittsburgh.

500 Tons, Burlington, Iowa, Raytheon Mfg. Co. plant to American Bridge Co., Pittsburgh.

450 Tons, Detroit, service building for Chrysler East Jefferson Plant, to Ingalls Iron Works, Detroit.

416 Tons, Various Locations, Santa Fe RR bridges 423 and A-318, to American Bridge Co., Pittsburgh.

400 Tons, Temple, Tex., state highway bridge, to Virginia Bridge Co., Roanoke, Va.

400 Tons, Littleton, N.H., plant for Norton Pipe Co. to American Bridge Co., Pittsburgh.

300 Tons, Bartow, Fla., washer and filtration plant for phosphate mine, to Tampa Shipbuilding Co., Tampa, Fla.

250 Tons, Providence, girl' dormitory, Brown University to Bethlehem Steel Co., Bethlehem, Pa., through Gilbane Building Co., Inc., Providence, contractor.

198 Tons, Oceanside, Calif., overcrossing over A.T. & S.F. RR., California Div. of Highways, through Fred D. Kyle, to Bethlehem Pacific Coast Corp.

150 Tons, Attleboro, Mass., plant for American Reinforced Paper Co. to Bethlehem Fabricators, Inc., Pittsburgh, through Austin Co., New York, contractor.

100 Tons, Boston, automotive building for Reo Motors, Inc., to unnamed fabricator.

100 Tons, Detroit, service garage and power room for Ira Wilson & Son Dairy Gratiot Plant, to J. L. Peters Co., Detroit.

• • • **Fabricated steel inquiries** this week were as follows:

885 Tons, Northfield, Ill., Willow Rd., state highway grade separation.

800 Tons, Los Angeles, U. S. Gypsum Co., paper plant.

700 Tons, Grosse Pointe, Mich., Board of Education, high school building.

670 Tons, Los Angeles, toll building, Southern California Telephone Co., P. J. Walker Co., general contractor; bids under advisement.

380 Tons, Aurora, Ill., Barber-Greene Co. factory building.

300 Tons, Chicago, American Colortype Co., manufacturing building.

300 Tons, Madison, Wis., Forsberg Paper Box Co., plant building.

284 Tons, Clallam Co., Wash., two bridges over Soleduck River, P.S.H. No. 9, bids to director of highways, Olympia, due Feb. 5.

210 Tons, Chicago, West 47th St. underpass.

200 Tons, Lancaster, Tenn., trestle.

• • • **Reinforcing bar awards** this week included the following:

800 Tons, Los Angeles, Los Angeles Times building, to Ceco Steel Products Corp., Omaha, Neb.

482 Tons, Red Bluff, Calif., five bridges between Los Molinos and Red Bluff, California Div. of Highways, to Ceco Steel Products Corp., Omaha, Neb., through J. D. Proctor, Inc.

250 Tons, Los Angeles, Superior Sleeprite building, to Soule Steel Co., San Francisco.

250 Tons, Near Mojave, Calif., two Cache Creek bridges, California Div. of Highways, to Soule Steel Co., San Francisco.

183 Tons, Petaluma, Calif., San Antonio and Novato Creek bridges, California Div. of Highways, to Sullivan Steel Service Co., through A. G. Raisch.

150 Tons, Maywood, Calif., Ford assembly plant, to Soule Steel Co., San Francisco.

150 Tons, Holyoke, Mass., brewery to Concrete Steel Co., Boston.

140 Tons, San Mateo, Calif., Bay Shore Freeway overcrossing, California Div. of Highways, to Ceco Steel Products Corp., Omaha, Neb., through Macco Construction Co.

116 Tons, Dixon, Calif., Sweeney Creek and McCune Creek, California Div. of Highways, to Judson-Pacific-Murphy Corp., through Fredrickson Bros.

115 Tons, Snowflake, Ariz., construction on Showlow-Holbrook highway, Arizona State Highway Commission, to Allison Steel Mfg. Co., through W. J. Henson.

• • • **Reinforcing bar inquiries** this week included the following:

900 Tons, Los Angeles, Rexall Drug Co. building, Louis C. Dunn Co., general contractor.

296 Tons, Kelso, Wash., three highway grade separation structures, bids to director of Highways, Olympia, due Feb. 5.

124 Tons, Clallam Co., Wash., two bridges over Soleduck River, P.S.H. No. 9, bids to director of highways, Olympia, due Feb. 5.

100 Tons, Waltham, Mass., city incinerator. J. R. Worcester Co., Boston Engineers. Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh contractor for incinerator.

• • • **Sheet piling awards** this week included the following:

870 Tons, Red Bluff, Calif., fixe bridges between Los Molinos and Red Bluff, California Div. of Highways, through J. D. Proctor, Inc., to Bethlehem Pacific Coast Corp.

• • • **Sheet piling inquiries** this week included the following:

286 Tons, Sebewaing, Mich., U. S. Army Engineers harbor project.

OPA Announces Ceiling Price Scrap Changes

Washington

• • • **Effective Jan. 30,** OPA has made changes in ceiling price provisions for iron and steel scrap with relation to the preparation of remote and direct purchases of unprepared old material. These changes were necessitated by the reduced allocation and distribution activities of CPA as compared with its predecessor, WPB, which extensively allocated scrap during the war. On Nov. 3, 1945, WPB was abolished and allocations were discontinued.

With respect to preparation of remote scrap, OPA has established a provision by which sellers of prepared material in transit for furnace use may add the applicable established preparation charges to their ceiling prices in any sale. Previously only basic preparation charges could be added to selling prices unless the scrap was allocated by WPB.

The other change provides that when a consumer who makes a direct purchase of unprepared scrap employs a dealer to prepare the scrap, the dealer may charge preparation fees or any other fees which, when added to the purchase price, plus full freight, will not result in an aggregate price higher than the maximum he would have to pay for prepared scrap material at the same original selling point plus freight. Heretofore, the seller could not add preparation charges in such a sale without receiving specific OPA approval of the preparation charges he wished to make.

This change in pricing provisions, OPA said, will permit steel mills to buy various types of metal structures or surplus war material which are to be scrapped, and which are costly to prepare and pay the preparer in excess of the established preparation fees—as long as the consumer does not pay total charges in excess of the ceiling price for the prepared grade.

Offer Surplus Tanks

New York

• • • **A list of surplus** storage and processing tanks has been prepared by the War Assets Corp., a subsidiary of RFC, identified as N. Y. list No. 205.

Copies may be obtained from the New York Agency at 70 Pine St., New York 5.

MACHINE TOOLS

. . . News and Market Activities

Shortages and Surpluses Drag on Market

Cleveland

• • • **While the wheels** of the machine tool market have turned steadily ahead in recent weeks, the general labor situation and the omnipresence of the government-owned surplus (as depressing a combination as the market has met in many a day) are slowly bringing them to a halt and competent observers can see no sounder ground immediately ahead. By and large, there are no labor difficulties in the machine tool industry itself, but sources in the trade feel that buyers have lost the feeling of eager-beavers, which was evident a month ago, and are now hesitant and waiting. This, however, is one of the intangibles.

In a more apparent manner, the machine tool builders have been hit by a shortage of electric motors and anti-friction bearings, shortages more-or-less a direct result of labor strife. With the steel industry paralyzed by what may be a prolonged strike, builders who place their orders at mill levels can already see the handwriting on the wall for about another month's operations.

These factors may easily serve to bring the government pool into sharp focus, which should mean that most of the machines made since 1941 will be absorbed. For their assistance in this, dealers and builders participating will realize some immediate financial gain. At the same time, the almost weekly announcement of new machines may tip the balance for some buyers in the direction of higher production equipment, in view of the possibility of higher labor costs.

Some dealers think that there will be little change in the current situation until most of the industrial strife has had its turn on the ironing board. And while this view is by no means universal, its proponents suggest that the queasy situation which has crystallized in the last few days may hold at least for the first quarter of this year and perhaps a good deal longer.

One source in the trade has expressed the opinion that the next nine months will see the various companies which make up the industry announcing new machine tools which represent a wide departure from their normal lines. This, obviously, will serve to make conditions more highly competitive when the market is freed from its internecine mire.

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Buys Shaper Firm

Cincinnati

• • • **Smith & Mills Co.,** one of this city's oldest tool making concerns, has been sold to the Harris-Karp-Goldsmith syndicate, according to local financial circles. For more than 60 yr, Smith & Mills Co. has manufactured shapers in a three-story brick building comprising 75,000 sq. ft. of floor space. No change of personnel is contemplated by the new owners who also control Hisey-Wolf Machine Co. here, and have an interest in the Cleveland Pneumatic Tool Co., Cleveland.

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Delayed Reaction Seen

Rockford, Ill.

• • • **Machine tool manufacture** here has not yet been affected by the steel strike, but most firms expect a delayed reaction to affect production later whether or not a prompt settlement is reached.

Holding an equally prominent place with steel strike worries is the electrical equipment industry shutdown which has cut off production of electrical motors and control devices. Even when the electrical suppliers were in production these products were in short supply and carried extended deliveries. With the strike interruption, machine tool production schedules promise to be disrupted by the break in the flow of electrical equipment.

The steel strike also will have a delayed reaction on production of castings for tools scheduled for future production, but some builders are hopeful that a short strike would allow foundries to squeeze through with a minimum disruption.

Special purpose machine tool builders generally are booked to capacity. Large inquiries have been received from the automotive industry despite strike interruptions, and tooling now is well underway on 1947 models.

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Expands Product Line

Cleveland

• • • **Warner & Swasey Co.** has entered the road machinery field with the manufacture of a new grading machine trade-named Gradall, according to Charles J. Stilwell, company president.

Designed for earth-moving in places not ordinarily accessible to previous types of excavating equipment, the new machine is hydraulically operated and has an arc welded, expandable 24-ft boom. The machine was invented by Ray Ferwerda, a contractor, and Warner & Swasey is licensed to build the machine under his patents.

Announcement of the grading machine marks another step in a long term program of product diversification which began last September with the announcement that Warner & Swasey was entering the textile machinery field. At that time, Mr. Stilwell said the program was not planned merely for the purpose of utilizing expanded facilities, but also as protection against the extreme fluctuations which are peculiar to the machine tool industry, and the impact of forthcoming sales of government-owned machine tools surpluses.

He's going to SOUTHERN AIRCRAFT CORPORATION, down in Garland, for the acceptance flight on our new company airplane. With room for five or six people, it sure looks like a good thing.

Executive travel has taken to the air, and we need that plane of Southern's to keep us ahead of competition. Jim says those two engines and variable pitch props guarantee top performance. He likes the tricycle landing gear, too . . . and even with my limited knowledge, I can see from the details Southern sent us, there isn't any finer plane construction — their war experience with Navy fighting planes, proves that. Then too, gyroscopic instruments and complete radio equipment will make weather flying a breeze.

What I particularly like, is the way the cabin is designed. Did you notice how roomy it is? And that fold-away desk . . . why we'll have our conference reports under way before Jim levels off on the homeward flight.

Anyway, get that reservation, and while you're at it, you might as well revise the schedule for the regional sales meetings . . . it won't take half the time now. And, oh yes, wire Southern . . . Jim is coming.

Southern
AIRCRAFT CORPORATION
PLANT IN GARLAND, DALLAS COUNTY, TEXAS

NONFERROUS METALS

. . . News and Market Activities

OPA Rejects Lead Price Increase Bid

New York

• • • **The agitation for** an increase in the authorized price of lead on the part of industry members and, in some instances, consumers has been taken to the proper government authorities by the appeal of the Industry Advisory Committee to officials of OPA. John W. Snyder, director of OWMR, is reported to have rejected the application for an increased price for lead while premium payments for marginal mine production are being made. These payments have been authorized until June 30 when the Act expires.

Foreign lead is coming in now only from Peru whose former rate of 3000 to 4000 tons per month is expected to be increased to 6000 tons this month. However, this does not make up for the loss of Mexican imports because of strikes at the mines. The government stockpile is known to be dropping rapidly because of the failure of imports and is expected to reach 60,000 tons at the end of January. Officials had previously expected the stockpile to reach 50,000 tons at the end of the quarter, but it appears that it could drop below this figure unless consumption is curtailed by restricting permissible uses.

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Copper and Nickel Production Down

Toronto

• • • **Demand for Canadian** copper is increasing at a rapid rate and it now is reported that producers have received inquiries for refined copper for first half delivery running some 20,000 tons more than they can fill. Actual demand for copper is said to be about 20 pct above production. The inquiries are from foreign sources and it is pointed out that about all Canadian producers can do is to take care of domestic demand and United Kingdom needs. It is problematical at this time as to how much copper can be made available to the U. S. up to the end of June. Canadian producers will fill 3700 tons of foreign copper orders in the first quarter of this year, but this is business that was booked in 1945. It is expected that demand for copper in the second half of 1946 may show even greater improvements and will continue well in excess of supply unless producers in this country return to wartime production levels. At present Canadian copper output is down about 45 pct from the wartime peak.

Canadian production of new copper in November amounted to 32,239,787 lb compared with 35,171,852 lb in October, and 43,811,150 lb in November 1944. For the 11 months of last year copper production totaled 443,019,969 lb against 501,245,928 lb in the like period of 1944.

Nickel production for November was 15,483,999 lb, compared with 17,244,911 lb in October, and 22,259,195 lb in November 1944. The total for the 11 months of last year was 230,920,272 lb against 252,820,425 lb in the corresponding period of 1944.

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Offer Aluminum Plants

Washington

• • • **War Assets Corp.** is offering for sale or lease an aluminum extrusion plant at Phoenix, Ariz., an aluminum reduction plant at Burlington, N. J., a plant at Greenfield, Wis., which made steel casings for bombs, and the plant at Lima, Ohio, where the Lima Locomotive Works, Inc., manufactured combat tanks, tank recovery vehicles, lifting cranes and shovels.

The aluminum reduction plant also was formerly operated by Alcoa. The project is divided into two principal units, the aluminum plant proper, with an annual capacity of 96 million lb of aluminum and alloys, and the carbon plant with an annual capacity of 115.2 million lb of the carbon electrodes used in reducing alumina to aluminum pig.

The plant at Greenfield is equipped with machines for boring, drilling, grinding, shaping and milling, lathes, forging machines, metal heating furnaces, washing machines and sprayers.

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Army Counsel Metal Group

New York

• • • **An advisory committee** has been formed to counsel the Army Industrial College on developments in the magnesium field, it has been announced by Gen. Donald Armstrong, commandant.

The following are members of the committee: Edw. S. Christiansen, president, Magnesium Co. of America, Inc., Chicago; T. W. Atkins, executive vice president, the Magnesium Asso., New York; Irving T. Bennett, vice president, Revere Copper and Brass, Baltimore; Wiser Brown, vice president of American Magnesium Corp., Cleveland; Anthony Cristello, foundry manager, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.; Leo B. Grant, sales manager, Dow Chemical Co., Midland, Mich.; Clayton E. Larson, operations manager, White Metal Rolling & Stamping Corp., Brooklyn; Dan W. Moll, vice president, Hills-McCanna Co., Chicago; O. L. Earl, vice president, Acme Aluminum Foundry Co., Chicago; D. A. Rhoades, general manager, Permanente Metals Corp., Permanente, Calif.; F. S. Wellman, president, Wellman Bronze & Aluminum Co., Cleveland; Arthur Bidwell, president, Superior Bearing Bronze Co., Inc., Brooklyn; T. Irving Moseley, president, Dalmo Victor, Inc., San Carlos, Calif.; E. Howard Perkins, president, Brooks & Perkins, Detroit; and C. A. Brantingham, president, Ebaloy Foundries, Inc., Rockford, Ill.

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U.S. Tin Operations

New York

• • • **The House Banking & Currency Committee** has reported with approval a measure which would permit the Texas City Tin Smelter to continue the purchase of foreign ore and smelting operations after June 30. If this action is later confirmed by Congress, it would seem to indicate that the government has adopted a policy to permit our continuation in the mining and smelting of tin in the Western Hemisphere.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$109 to $112
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	7.25 to 10.00
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	26.50	26.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 3 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c.

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 99 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	5.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00[1]
Manganese bronze solids	6.00[2]
Manganese bronze borings	6.25[1]

OPA Group 4†

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	4.00
25S turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.25
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb.; 90 to 98% Ni, 23¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20¾
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23¾
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.5083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.38

SCRAP

Steel Strike Curtails Scrap Movement

New York

• • • **The steel strike** has made itself felt in the scrap industry during the past week by curtailing scrap movement. However, Cleveland and Chicago report an exception to this general rule, in that major consumers in these areas have halted shipments, not because of the strike, but because of adequate inventories.

In an effort to increase supplies of iron and steel scrap, the OPA will permit, effective Jan. 30, sellers of remote scrap prepared in transit for furnace use to add established preparation charges set up in MPR No. 4. Previously, only the basic $3.50 per gross ton could be charged unless allocated by WPB in which case established preparation charges could be included. Scrap allocations have been discontinued.

For article on OPA Changes in Scrap Prices, see page 123.

In spite of the reduced scrap operations, prices are holding firm.

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PITTSBURGH—Deliveries of scrap in this area are fairly active because of two big customers that are not out on strike, Weirton and Armco at Butler. Practically all companies have cancelled contracts with the exception of these two and Carnegie. Yards are taking very little into yard stock for future use of steel companies. Deliveries on the whole are down, but not to the extent expected.

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CHICAGO—Shipments have not yet been held up on top openhearth steel grades, but storage problems have resulted in hold orders on turnings by one major consumer. Lack of storage space in some instances has resulted in consideration being given to extending the hold orders and if the strike continues through the week, action may be taken by additional mills. The market remains virtually unaffected with strength apparent in all sectors.

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PHILADELPHIA—One mill here is continuing to take a little scrap despite the strike, but some local scrap is said to be beginning to move toward western Pennsylvania mills. The market continues firm with all prices at ceilings.

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DETROIT — Demand continues just about as strong as ever, while supply remains in lower ground. Local mills are all taking scrap, and shipments to outside points, for the most part, are being maintained without change, so prices stay pegged at ceiling levels.

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BOSTON — Steel strike, frozen yard stockpiles and zero weather have cut down shipments. However, scrap is going to Weirton in limited tonnages and to storage yards elsewhere in Pennsylvania. Recent step-up in deliveries to foundries notwithstanding, they are in urgent need of cast and low phos. Some government surplus machine tools are being broken up for foundry use.

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NEW YORK—Scrap movement has dropped slightly as a result of the steel strike, although prices are holding firm at ceiling. Schiavone-Bonomo Corp. was awarded 2500 tons of unprepared heavy and misc. scrap at a sale held by the Brooklyn Navy Yard during the past week, with a bid of $12.79 per ton; other bids ranged from $11.83 to $9.35.

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BUFFALO — Activities in the local scrap market slowed down to a crawl this week as the last of the district's "big three" mills called a halt to shipments when its sidings became plugged with loaded cars. A few foundries were still accepting tenders, including Pratt & Letchworth, which has a contract with the United Electrical, Radio & Machine Workers (CIO) instead of the United Steelworkers, and therefore has not been affected by the strikes.

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ST. LOUIS—Although all of the openhearth furnaces in the St. Louis district are down, except three (Laclede), all are accepting shipments of scrap iron and are continuing their purchases so as not to stop the flow of this material. Steel casting plants are asking that shipments be withheld. Shipments to this market have been smaller as a result of cold weather, plus the shortage of man power to handle the material. Prices are firm and unchanged.

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CINCINNATI—Steel scrap is moving to two steel interests in this area, but elsewhere embargoes are holding up all shipments. One of the interests in the area, not affected by the strike, is receiving shipments regularly, while the other, affected by the strike has received permission from the union to accept material and unload. The market generally, however, continues to rule very strong with prices at the ceiling and the available material inadequate to take care of all requests.

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CLEVELAND—While most major consumers have halted scrap shipment because of adequate inventories, rather than the strike, all grades continued to bring ceiling prices with movement largely to mills not strikebound or to dealers yards for storage. In the last two weeks one major consumer has brought his inventory up from 3000 to 20,000 tons which suggests to some observers that the general situation will be much improved when the strike is over. Generally, dealers yards are not being used for interim storage for the mills, although many have been offered the opportunity.

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BIRMINGHAM—Movement of openhearth material has ceased here as a result of the steel strike but foundries are creating a very strong demand for cast scrap. Freight allowance on cast has been pushed from a maximum of $2.50 per ton to $6. Dealers in this area are not attempting to build up stocks pending further developments.

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TORONTO — Shortage in Canada's scrap iron and steel supply is continually becoming more serious. The lack of scrap is more serious than it might otherwise be owing to the fact that special attention is being given to increasing steel production to provide supplies to offset shortages caused by stoppage of imports from the United States due to the steel strike. Dealers state that it is almost impossible to increase scrap supply at this time as winter conditions make collections in rural districts impossible.

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Officers Reelected By Scrap Institute

Chicago

• • • **All officers** of the Institute of Scrap Iron and Steel, Inc., were reelected at the annual business meeting held here recently. Officers reelected were Edwin C. Barringer, president and executive secretary; Philip W. Frieder, Philip W. Frieder Co., Cleveland, first vice-president; Wm. J. Wolf, Wolf & Co., Hamilton, Ohio, second vice-president; Walter Erman, Erman Howell & Co., Chicago, secretary; and Samuel G. Keywell, The Samuel G. Keywell Co., Detroit, treasurer.

William Pohn, Pohn Iron & Steel Co., Chicago and George Stout, Luria Brothers & Co., Philadelphia, were elected directors at large for a 2-yr term. Frank B. Gordon, Harcon Corp., Boston; Darwin S. Luntz, The Luntz Iron & Steel Co., Canton, Ohio; Herman D. Moskowitz, Schiavone Bonomo Corp., Jersey City, and Max Schlossberg, Max Schlossberg Co., Chicago, were reelected as directors at large for 2-yr terms. Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va., was elected a director at large to serve one year.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Angles & splice bars	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	$13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	23.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	13.50 to 13.25
No. 3 bales	8.50 to 9.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$13.00 to $14.25
No. 2 hvy. melting	12.00 to 13.25
No. 1 bales	12.00 to 13.00
No. 2 bales	11.00 to 12.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Jan. 29, 1946	Jan. 22, 1946	Dec. 25, 1945	Jan. 30, 1945
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Jan. 29, 1946	Jan. 22, 1946	Dec. 25, 1945	Jan. 30, 1945
No. 2 foundry, Phila.	$27.59	$27.59	$27.59	$25.84
No. 2, Valley furnace	25.75	25.75	25.75	24.00
No. 2, Southern, Cin'ti	26.19	26.19	26.19	24.44
No. 2, Birmingham	22.13	22.13	22.13	20.38
No. 2 foundry, Chicago†	25.75	25.75	25.75	24.00
Basic, del'd eastern Pa.	27.09	27.09	27.09	25.34
Basic, Valley furnace	25.25	25.25	25.25	23.50
Malleable, Chicago†	25.75	25.75	25.75	24.00
Malleable, Valley	25.75	25.75	25.75	24.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

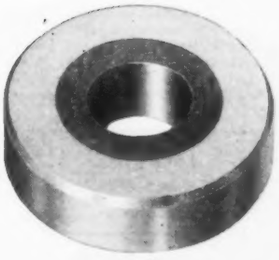
	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 29, 1946	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One week ago	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One month ago	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One year ago	2.38444¢ per lb.	$23.61 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.44076¢ Oct. 2	2.38444¢ Jan. 2	$25.37 Oct. 23	$23.61 Jan. 2	$19.17	$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17	$15.67 Oct. 24
1943	2.25513¢	2.25513¢	23.61	23.61	19.17	$19.17
1942	2.26190¢	2.26190¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31778¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

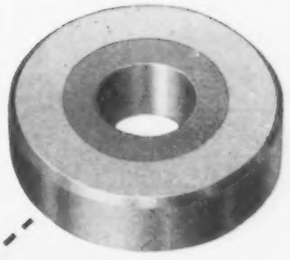
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



MALTA CARBIDES

From large 36" carbide inserted drawing and blanking dies to ⅛" solid drilled carbide dies, guides and bushings.

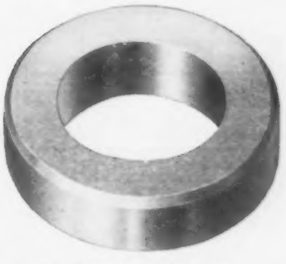


T & V . . .

Cast cobalt, chrome, tungsten alloy furnished in solid or inserted dies afford higher resistance to shock than tungsten carbide and more wear resistance than high alloy steels.

Now! it's here . . .

JESSOP 3 WAY DIE SERVICE



CAST-TO-SHAPE

High carbon-high chrome steels, cast to shape with close tolerances requiring a minimum of machine finishing.

ANOTHER Jessop FIRST—a complete die service which includes finished dies of the three types illustrated; also carbide and cast non-ferrous alloy inserts for reclaiming worn dies or for shops making their own dies. In addition, Jessop supplies bars and forgings of highest quality tool steels for die makers.

Each of the above materials has a separate field in which it is superior, and Jessop maintains a staff of qualified engineers who, in consideration of the following factors, will suggest and recommend the best material for the job:

- Type of operation
- Original die cost
- Total production required
- Production expectancy of each material

Established 1901

JESSOP STEEL COMPANY

Head Office and Works . . . WASHINGTON, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb. to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15c. per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[16]	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($31.00 f.o.b. mill)														
Carbon, forging	$36	$36	$36	$36	$36	$36	$36								
Alloy	$45	$45				$45	(Bethlehem, Massillon, Canton, Coatesville—$45)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	(Provo—$47.20, Duluth—$38[14]) $36	$36	$36	$36	$36	$36	$36	$36				$48[14]	$38		
Carbon, forging	(Provo—$53.20, Duluth—$44[14]) $42	$42	$42	$42	$42	$42	$42					$54[14]	$44		
Alloy	$54	$54				$54		(Bethlehem, Massillon, Canton—$54)					$56		
SHEET BARS	$36	$36		$36		$36	$36	$36	(Canton—$36)						
PIPE SKELP	1.90¢	1.90¢					1.90¢	1.90¢	(Coatesville—1.90¢)						
WIRE RODS[15] No. 5 to 9/32 in.	2.15¢	2.15¢		2.15¢	2.15¢	(Worcester—2.25¢)					2.40¢	2.65¢			
SHEETS Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes[2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP Hot-rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold-rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester—3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester—3.35¢)					3.05¢	3.31¢	
TINPLATE Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.36	$5.32
Electro, box (0.25 lb)	$4.35	$4.35	$4.35					$4.45							
Electro, box (0.50 lb)	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box (0.75 lb)	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE 29 gage[5]	3.05¢	3.05¢	3.05¢					3.15¢	3.15¢			4.05¢[11]			3.37¢
TERNES, MFG. Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25	(Duluth—2.35¢, Provo, Utah 2.95¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel[6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished[8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢			(Detroit—2.80¢)		(Toledo—2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢	2.70	(Bethlehem, Massillon, Canton—2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES Carbon steel[13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	(Coatesville and Claymont—2.25¢, Provo, Utah 2.95¢) 2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville—3.50¢)						3.95¢	4.15¢		3.70¢	3.68¢
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem—2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester—3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester—4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester—6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester—8.55¢)								
WIRE[9] Bright[12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester—2.85¢)		(Duluth—2.80¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester—3.45¢)					3.85¢			3.67¢
PILING Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36.00	34.00	26.50	29.00	32.50	36.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30.00	28.00	22.00	22.50	32.00	52.00
Rod h-r, Newark, N. J., Syracuse	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 8 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades, f.o.b. Pittsburgh

	per lb
Field grade	3.30¢
Armature	3.65¢
Electrical	4.15¢
Motor	5.05¢
Dynamo	5.75¢
Transformer 72	6.25¢
Transformer 65	7.25¢
Transformer 58	7.75¢
Transformer 52	8.55¢

F.o.b. Chicago and Gary, field grade through motor; F.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., gross ton $43.00
Angle splice bars, 100 lb..... 2.70

(F.o.b. basing points)	*per gross ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	base per lb
Cut spikes	3.25¢
Screw spikes	5.40¢
Tie plate, steel	2.30¢
Tie plates, Pacific Coast	2.45¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

*(*Also Canton, O.)*	*base per lb*
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	*Sheet*
Stainless-clad		
No. 304, 10 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00*	19.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.00	....
Inconel-clad		
10 pct, f.o.b. Coatesville	25.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	base per keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.20	$3.70
Annealed galv. fence wire	3.55	4.05
	base column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	93
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.00	$12.00
15-lb coating I.C.	7.00	14.00
20-lb coating I.C.	7.50	15.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms, and Slabs	Bars and Bar-strip	Billets, Blooms, and Slabs
NE 8600	0.65¢	$13.00	$1.15	$23.00
NE 8700	0.70	14.00	1.20	24.00
NE 9400	0.75	15.00	1.25	25.00
NE 9700	0.65	13.00	1.15	23.00
NE 9800	1.30	26.00	1.80	36.00
NE 9900	1.20	24.00	1.55	31.00

The extras shown are in addition to the base price of $2.70 per 100 lb on finished products and $54 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and $5 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$12.00 per net ton

Steel (buttweld)

	Black	Galv.
½-in.	63½	51
¾-in	66½	55
1-in. to 3-in.	68½	57½

Wrought Iron (buttweld)

½-in.	24	3½
¾-in.	30	10
1-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18

Steel (lapweld)

2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½

Wrought Iron (lapweld)

2-in.	30½	12
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½- in. to 8-in.	32½	17

Steel (butt, extra strong, plain ends)

½-in.	61½	50½
¾-in.	65½	54½
1-in. to 3-in.	67	57

Wrought Iron (same as above)

½-in.	25	6
¾-in.	31	12
1-in. to 2-in.	38	19½

Steel (lap, extra strong, plain ends)

2-in.	59	48½
2½-in. and 3-in.	63	52½
3½-in. to 6-in.	66½	56

Wrought Iron (same as above)

2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and tapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	Hot-Rolled	Lap-weld, Hot-Rolled
2 in. O.D. 13 B.W.G.	15.03	13.04	12.38
2½ in. O.D. 12 B.W.G.	20.21	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, f.o.b. cars, San Francisco or Los Angeles	46.00 69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	Consumer Percent Off List
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shallbe taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
I. A. 6on6x13 Jan 15 Sweeney (18) Chicago, del'd	13.75
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b.) oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	14.25
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Per 1000
Super-Duty brick, St. Louis	$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey	51.95
No. 1 Ohio	45.60
Ground fire clay, net ton	8.05
Silica Brick	
Pennsylvania and Birmingham	$54.00
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55
Chrome Brick	Per Net Ton
Standard chemically bonded, Balti., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore*	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[8]	$4.868[a]	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$6.866	$7.072	$8.172
New York	3.59	4.613	5.210	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.324[9]	4.106	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.994	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.471	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.331	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.80	6.65	6.65	7.75
Milwaukee	3.387	4.337	5.372	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	8.137
Cleveland	3.35	4.40	4.977	3.60	4.45[17]	3.40	3.588	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.85	3.819	4.689	3.63	3.40	3.35	3.85	5.80	6.65	6.65	7.75
Detroit	3.45	4.50	5.10	3.70	4.659[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.925[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St Louis	3.397	4.347	5.231	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.85	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.65	7.75
St. Paul	3.50	4.46	5.357	3.86	5.102[17]	3.813	3.813	3.763	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.615	4.143	....	4.093	4.093	4.043	4.543	....	....	....	....
Indianapolis	3.52	4.568	5.018	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.85	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965	4.78	5.365	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.458	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.413[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20	6.20	4.95	5.613[15]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.45	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	6.05	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.85	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.271[3]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-FINISHED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

GALVANIZED: 450 to 1499 lb.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$26.25	$26.75	$27.25	$27.75	....
Birdsboro	26.25	26.75	27.25	27.75	$31.25
Birmingham	20.75	22.13	....	26.75	....
Buffalo	24.75	25.75	26.25	26.75	31.25
Chicago	25.25	25.75	25.75	26.25	....
Cleveland	25.25	25.75	25.75	26.25	....
Detroit	25.25	25.75	25.75	26.25	....
Duluth	25.75	26.25	26.25	26.75	....
Erie	25.25	25.75	26.25	26.75	....
Everett	26.25	26.75	27.25	27.75	....
Granite City	25.25	25.75	25.75	26.25	....
Hamilton	25.25	25.75	25.75	....	....
Neville Island	25.25	25.75	25.75	26.25	....
Provo	23.25	23.75	....	....	....
Sharpsville [1]	25.25	25.75	25.75	26.25	....
Sparrows Point	26.25	26.75	....	....	....
Steelton	26.25	....	....	....	31.25
Swedeland	26.25	26.75	27.25	27.75	....
Toledo	25.25	25.75	25.75	26.25	....
Youngstown	25.25	25.75	25.75	26.25	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.75	$27.25	$27.75	$28.25	....
Boston	Birdsboro-Steelton	4.02	....	....	....	....	$35.27
Brooklyn	Bethlehem	2.50	28.75	29.25	29.75	30.25	....
Brooklyn	Birdsboro	2.92	....	....	....	....	34.17
Canton	Clev, Ygstn, Sharpsvil	1.39	26.64	27.14	27.14	27.64	....
Canton	Buffalo	3.19	....	....	....	....	34.44
Cincinnati	Birmingham	4.06	24.81	26.19	....	....	....
Cincinnati	Hamilton	1.11	....	....	26.86	....	....
Cincinnati	Buffalo	4.40	....	....	....	....	35.65
Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	....
Jersey City	Birdsboro	1.94	....	....	....	....	33.19
Los Angeles	Provo	4.95	28.20	28.70	....	....	....
Los Angeles	Buffalo	15.41	....	....	....	....	48.66
Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	....
Mansfield	Buffalo	3.36	....	....	....	....	34.61
Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	....
Philadelphia	Birdsboro	1.24	....	....	....	....	32.49
San Francisco	Provo	4.95	28.20	28.70	....	....	....
San Francisco	Buffalo	15.41	....	....	....	....	48.66
Seattle	Provo	4.95	28.20	28.70	....	....	....
Seattle	Buffalo	15.41	....	....	....	....	48.66
St. Louis	Granite City	.50	25.75	26.25	26.25	26.75	....
St. Louis	Buffalo	7.07	....	....	....	....	33.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$31.25; f.o.b. Buffalo—$32.50. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Ferromanganese Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66% contained Mn. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point with freight allowed. Spot sales add 2¢ per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Spiegeleisen

Maximum base contract prices per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Low-Carbon Ferromanganese

Contract prices per pound of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, eastern zone. Add 0.25¢ for spot sales.

	Carloads, Ton	Less
0.06% C, 0.06% P, 90% Mn	23.00¢	23.40¢ 23.65¢
0.10% max. C, 1% or 2% max. Si	23.00¢	23.40¢ 23.65¢
0.15% max. C, 1% or 2% max. Si	22.00¢	22.40¢ 22.65¢
0.30% max. C, 1% or 2% max. Si	21.00¢	21.40¢ 21.65¢
0.50% max. C, 1% or 2% max. Si	20.00¢	20.40¢ 20.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢ 16.65¢

Electric Ferrosilicon

OPA maximum base price cents per pound contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Silvery Iron

Si 14.01 to 14.50%, $47.25 per G. T. f.o.b. Jackson, Ohio; $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per pound of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb, packed. Add 0.25¢ for spot sales.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

OPA maximum base price per pound of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add 25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
2000 lb-carload	3.80¢	4.20¢	4.35¢

Silicomanganese

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Add 25¢ for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
2000 lb to carload	6.70¢
Briquet, contract basis, carlots, bulk freight allowed, per lb	5.80¢
2000 lb to carload	6.30¢
Less ton lots	6.55¢

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per pound of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add 0.25¢ per lb contained Cr for spot sales.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	21.00¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

Ferrochrome Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60% contained chromium. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.35¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. Add 0.9¢ for central zone; 0.49¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2¢ for spot sales.

Shot or ingot	45¢

Ferroboron

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% Max. C.

	Eastern	Central	Western
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per pound of alloy, f.o.b. shipping point, freight charges allowed. Add 5¢ for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination.

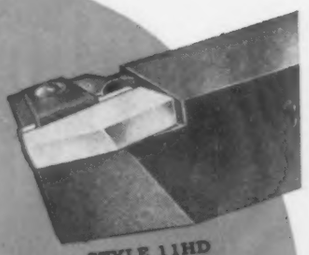
15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern	Central	Western
11,200 lb or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, standard grade lump or ¼X down, packed f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per pound contained tungsten, 10,000 lb or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, usual freight allowances, per pound contained V.	
Openhearth	$3.70
Crucible	$3.80
Primos	$3.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producers plant, usual freight allowances, per pound of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per pound conatined V_2O_5. Spot sales add 5¢ per lb contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. plant with usual freight allowances, per pound of alloy.	
carload lots	25¢
2000 lb to carload	26¢
Silvaz No. 3, contract basis, f.o.b. plant with freight allowances, per pound of alloy.	
Carload lots	58¢
2000 lb to carload	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb and over, max. based on rate to St. Louis	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb	45¢
Less ton lots, per lb	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per pound contained Cb.	
2000-lb lots	$2.25
Under 2000-lb lots	$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.33
Less ton lots	$1.35
Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per pound contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed east of Mississippi, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo g.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per pound of alloy. Add ¼¢ for spot sales	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per pound of alloy	
Carload, bulk	4.60¢
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75¢
Ton lots	7.25¢
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

NOW - *New** *Clamped-on Tip* KENNAMETAL TOOLS FOR LIGHTER MACHINING JOBS



STYLE 11HD
Available in shank sizes:
Square—1-1/4", 1-1/2", 2".
Flat—1" x 2", 1-1/2" x 2".

STYLE 11CL
Available in shank sizes:
Square—1".
Flat—1" x 1-1/4", 1" x 1-1/2".

STYLE 1CL
Available in shank sizes:
Square—1".
Flat—1" x 1-1/4", 1" x 1-1/2".

STYLE 12HD
Available in shank sizes:
Square—1-1/4", 1-1/2", 2".
Flat—1" x 2", 1-1/2" x 2".

STYLE 12CL
Available in shank sizes:
Square—1".
Flat—1" x 1-1/4", 1" x 1-1/2".

STYLE 2CL
Available in shank sizes:
Square—1".
Flat—1" x 1-1/4", 1" x 1-1/2".

TWO new styles of tools—straight and offset shanks—with clamped-on Kennametal tips, have been developed so that the outstanding operating and maintenance advantages that characterize our now well-known HD line for heavy duty work, may also be realized on lighter machining jobs. Among the advantages provided by these new tools are:

More consistent performance and greater durability from thermally strain-free assembly;

Smooth, unimpeded chip flow assured by perfected clamping arrangement, correctly positioned;

Exceptionally strong Kennametal tip—diamond ground on bottom face—firmly supported by plane surface of heat-treated steel shank;

Dull tips can be advanced, resharpened time and again, and major part utilized—tip only is reground;

Fewer tools to stock—many tips can be used during life of one shank;

Tips of different grades can be clamped in same shank;

Tips can be supplied with permanent, molded-in chip breaker, constant in depth, but adjustable in width by varying amount ground from end, or side cutting edges.

Illustrations show the new styles, as well as the widely used HD style, of clamped-on-tip Kennametal tools. Captions indicate sizes available.

SEND TODAY FOR SUPPLEMENT 2 . . .

. . . of Catalog 45, for complete specifications and prices.

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

TRADE MARK REG. U. S. PAT. OFF.

KENNAMETAL *Inc.*, LATROBE, PA.

Reparations Plants Now Available from Germany

Washington

• • • **Coming at a time** when the Surplus Property Administration is attempting to dispose of some $8 billion worth of plants and industrial real property, doubt exists that American firms will engage in feverish bidding for the 43 German plants which have just been put on the market by the Allied Control Council. The list of plants, ranging from pig iron to aluminum foil in products they make, is the first of two groups released by the State Dept. and the Office of International Trade, Dept. of Commerce. The plants have been declared available for allocation on the German reparations account.

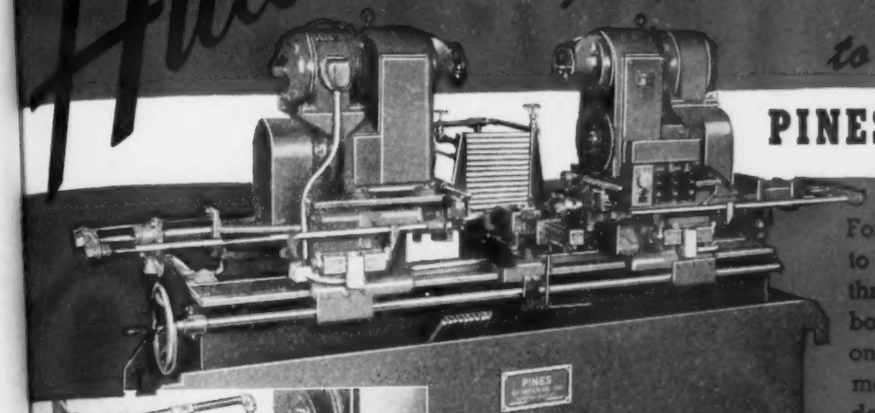
American firms or persons interested in acquiring any of the German plants have been asked to indicate promptly their interest. Those desiring to transfer the plants to the United States were told to inform the OIT while those desiring to transfer the plants to a third country were asked to file a statement of interest with the Div. of Investment and Economic Development, Dept. of State. For plants in Group I, available for allocation by ACC to the Inter-Allied Reparation Agency and to Russia and Poland, statements should be received by Jan. 10. For plants in Group 2, available for allocation among member nations by the Inter-Allied Reparation Agency, statements should be received by Jan. 25.

It is expected that some of these plants will be available by the latter part of the year after allocations and dismantling, packing and transportation arrangements are made. Details concerning the plants will be furnished by the State Dept. and OIT. The plants produce such products as machine tools, pig iron, screw machines, aircraft parts, ignition equipment, forgings, ball bearings, harvesting equipment and chemicals.

It was announced by the Dept. of Commerce that in determining which plants will be claimed for transfer to this country consideration will be given to the need for and availability of such facilities. Persons or firms interested in purchasing for transfer to this country any German plant on the list and having information concerning

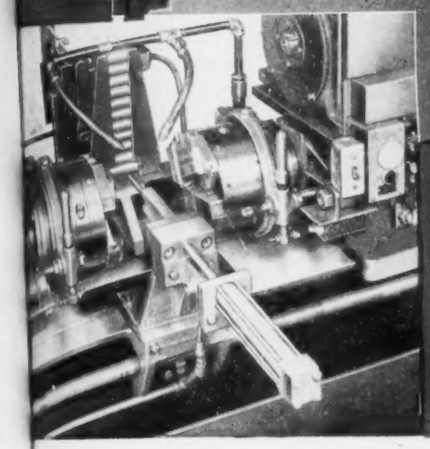
PINES *Automatic* TUBE FABRICATING EQUIPMENT

For Precision High Speed Production to Close Tolerances!

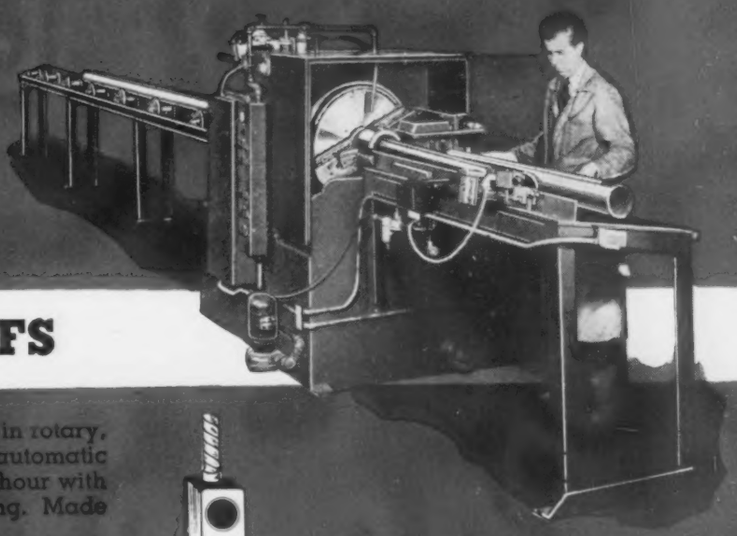


PINES *Automatic* PROFILERS

For processing tubes from the smallest sizes up to 6" O.D. and 100 feet long. Operations include threading, burring, chamfering, facing, flaring, boring, centering, turning, drilling and reaming, one or both ends simultaneously. Pines Automatic Profilers are made in 3 sizes, single and double spindle types. A typical production figure is 1500 ¾" burred tubes per hour or 700 ¾" pipe nipples threaded per hour.



Heavy Duty Construction

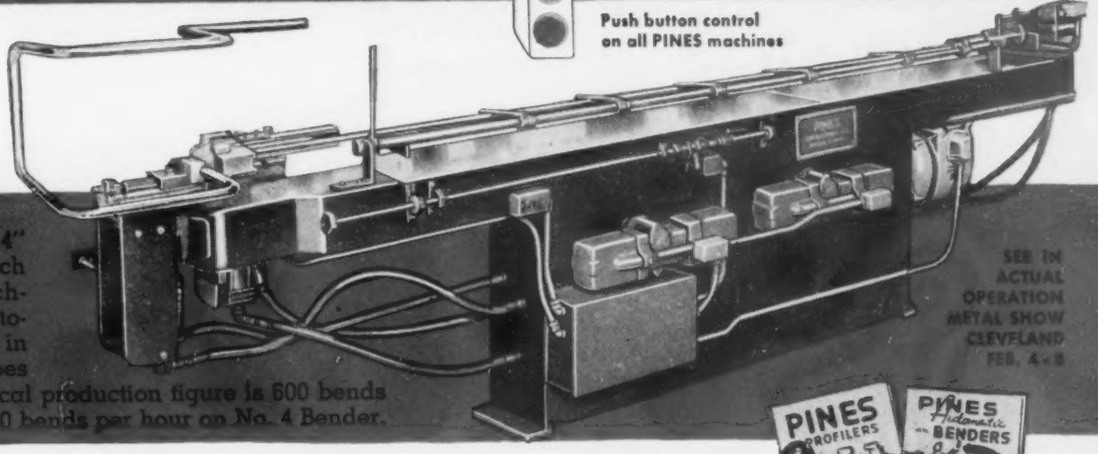


PINES *Automatic* CUT-OFFS

for cutting off tubes of any size or kind up to 5" O.D. Made in rotary, friction and disc types, all of which are available with full automatic operation. A typical production figure is 1500 2" tubes per hour with friction cutting and 150 5" tubes per hour with rotary cutting. Made in 3 different sizes.

Push button control on all PINES machines

PINES *Automatic* BENDERS



bending tubes or pipe up to 4" O.D. Many exclusive features such the patented Booster Attachment, Angle-of-Bend Selector, automatic Mandrel Extractor. Made in standard sizes and special types specific applications. A typical production figure is 600 bends hour on No. ¾ Bender and 60 bends per hour on No. 4 Bender.

SEE IN ACTUAL OPERATION METAL SHOW CLEVELAND FEB. 4-8

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SPECIALISTS IN TUBE FABRICATING EQUIPMENT

it were asked to furnish as much detail as possible to the OIT as to location, ownership, type of production and equipment. In the event the plant is subsequently declared available for removal as reparation, the interested person or firms will be informed.

Persons who own or have a substantial property interest in industrial plants in Germany which may be declared available for removal on reparation account and who desire to purchase and tranfer such plants for operation in other foreign countries were told to communicate with the Div. of Economic Development, State Dept. The announcement said that it is expected that wholly owned German plants will be the first to be ear-marked for removal from Germany but the program of reparation and economic disarmament may require the removal of some industrial plants wholly or partly owned by nationals of Allied countries.

Whenever a plant in which a substantial American property interest exists is ear-marked for removal, it was pointed out, the Dept. of State will determine after consulation with the American owners involved whether the United States should claim such plant as part of its reparation share. If the plant in question is actually obtained by the United States government as reparation, the statement said, due consideration will be given to the American property interests in determining the new foreign location of the plant and the conditions of its sale. Persons or firms who desire to purchase other German plants, which have or may become available as reparation, in order to transfer them to other foreign countries for operations were also asked to communicate with the Division of Investment and Economic Development.

Claims of American firms or persons arising out of removal of plants in which they may have a property interest will be settled, it was stated, in accordance with such legislation as Congress may enact.

Among the plants in Germany available for allocation are the following:

GROUP I:

Deutsche Schiff-und Maschinenbau A. G., shipbuilding plant, at Bremen-Valentin
Norddeutsche Huette Aktiengesellschaft, coke and by-products, at Bremen
Norddeutsche Dornierwerke No. 2 factory, aircraft parts, at Leubeck

Metallwereke Wolfenbuettel GMBH, Wolfenbuettel near Brunswick
Stuhlrehrfabrik Von Rudolf Sieverts, Hamburg Bergedorf
Norddeutsche Dornierwerke No. 7 factory, Sierksrade
Werke Tscheldin, aluminum foil, Tennigen
Maschinenfabrik Fahr A. G., harvesting equipment and tractors, Gottmadingen
Maschinenfabrik Gebruder Kramer, tractors, Gottmadingen
R. Bosch, ignition equipment, Sulz (Wurtenberg)
Suddeutsche Arguswerke, small screw pieces, Baden-Baden

GROUP II:

Power plant of the Grosskraftwerke Mannheim A. G., at Mannheim
Machine plant, Hanwell-Lug, at Dusseldorf
Firepoofing plant, Bendorf on Rhine, at Bendorf
One-half ballbearing works of Kugel Fisher at Schweinfurt
Lathe and machine tool plant, Wagner at Dortmund
Lathe and machine tool plant, Fretz Mueller at Esslingen
Lathe and machine tool plant, Bohne Kohle at Esslingen
Klockner Humbolt Dietz, diesel engine plant at Oberursel
Hastedt steam-electric plant at Bremen
Togency hydro-electric plant at Muhldorf
BMW motorcycle plant at Munich
Forgings and crankshafts plant, Kusbellwellenwerke, Glinde at Hamburg

Truck Group Elects Officers

Pittsburgh

• • • **Election of new** officers by the Electric Industrial Truck Assn. at a recent meeting in New York has been announced. Chosen president for 1946 was Gordon J. Berry, vice-president of the Electric Products Co., Cleveland. F. J. Shepard, Jr., treasurer of the Lewis-Shepard Sales Co., Boston, was elected vice-president.

F. J. Shepard, Jr.

Gordon J. Berry

The retiring president, E. W. Allen, of Thos. A. Edison, Inc., presented new plans for 1946 embracing a broad advertising and educational program, to be conducted under Charles F. Kells, Pittsburgh, which was approved. The association comprises major producers of electric trucks, batteries and charges, used by industry in mechanizing the flow of materials.

Machinery Dealer's Assn. Poses Strong Questions to RFC

Cleveland

• • • **At the recent meeting** of the board of directors of the Machinery Dealers National Assn. in New York, a number of questions pertinent to the dealer's function under the newly approved Surplus Property Administration-RFC plan for utilization of normal channels of trade in the disposal of surplus machine tools were placed before John S. Cooke, acting deputy director of the Consumer Goods Div., Office of Surplus Property, RFC.

Answers to the questions posed by the Machinery Dealers National Assn. bring into sharp focus numerous ramifications of the SPA-RFC plan, which is now getting underway, and at the same time, cast proper light on some of the problems confronting dealers while the program is still in an incipient stage.

Selected questions and the answers given follow:

(1) *Question.* How long will it take to process these applications?

Answer. We are informed the applications will be processed as quickly as possible. Some applications will be approved very quickly, and others, which must be submitted to Washington for review, will take a much longer period of time to be processed. We have been advised that all applications will be processed without any unnecessary delay.

(2) *Question.* What type of identification will be supplied the dealer and his employees?

Answer. When the dealer receives his copy of the signed agreement from RFC, this copy will be evidence of his being an "Approved Dealer." Should his employees need a copy, it has been suggested that the original agreement be photostated. RFC will issue no other type of identification.

(3) *Question.* What type of order forms and other material will be supplied the dealer?

Answer. The local office of RFC will supply the Approved Dealers in their district the standard order forms used by that office, and will bear the following legend, "This order placed through ..... an approved dealer, under Contract Number MT Approved Dealer No. ....."

(4) *Question.* How will the dealer know what equipment is available for him to offer for sale?

Answer. Since each office of RFC will possibly use a slightly different method of keeping their current records up to date, each dealer (approved) should keep in close contact with the RFC man in his district, who handles the approved dealer program to determine what items are available—have been sold—held for a certain period — new items added to the list.

(5) *Question.* What procedure should the dealer follow in placing an order?

Answer. It should be remembered that inquiries are not considered as orders until they have been signed and delivered to RFC by mail or in person. It will be stamped at the time of receipt and will go through the various channels in the RFC office necessary to process any order given to RFC. Immediately upon its acceptance by RFC, the "approved dealer" will be notified, either by telephone or in writing. In the event the buyer asks for credit, a reasonable time will be required to establish such credit. Letters of credit from a buyer's bank will be honored by RFC.

(6) *Question.* How long may a dealer expect RFC to hold specific items while he is attempting to obtain a bona fide order from the user?

Answer. Each local office at the present time has a different length of time for which it will hold machines. However, a five day period seems to be a reasonable length of time at

the present. Items being held by RFC for users and showing a "red sold tag" may become available for sale by the dealer within five days or less. RFC will tell the dealers when the option expires. (Cleveland RFC will freeze for seven calendar days only on receipt of "Request to Purchase" signed by a customer.)

(7) *Question.* Where can the user get information about specific equipment?

Answer. The dealer should be in a postion to supply information to his customers, because of his familiarity with the equipment being offered in his area.

(8) *Question.* Can the dealer promise specific information about equipment?

Answer. The dealer should be very careful to describe the equipment as it has been identified by RFC.

(9) *Question.* Spot Sales. May a dealer buy equipment for the gross price at spot sales?

Answer. Yes.

(10) *Question.* Can a dealer as a representative of the buyer buy equipment at a spot sale and obtain his commission for the service rendered?

Answer. Yes. However, the dealer should register his customer with the RFC personnel prior to the sale.

(11) *Question.* When a dealer buys equipment at the gross price, may be resell the equipment at the OPA ceiling or less?

Answer. Yes. When buying for his own account he would receive no commission from RFC and the price at which he resells would not be under the control of RFC.

(12) *Question.* Can a dealer advertise by circular letters, magazines, newspapers, etc., that he is an approved dealer and licensed to sell RFC equipment to his customers at the same price which they would pay RFC if buying direct?

Answer. All advertising should be submitted to

your local RFC office for approval. However, if a customer inquires about a specific item, and you answer him by letter, and in the same letter suggest that he might be able to use another type of equipment which is available, this would not be considered as advertising and require RFC approval.

(13) *Question.* May the dealer sell industrial equipment which RFC has priced under the extended Clayton Formula pricing method, or if the pricing committee has placed a price on a specific piece of industrial equipment?

Answer. Yes.

(14) *Question.* Will equipment older than the year 1921 be scrapped by RFC?

Answer. It is a policy of RFC to expend no effort on equipment built before this date.

(15) *Question.* What are the credit terms which RFC will extend a user?

Answer. A minimum down payment of 15 pct, a maximum time of 5 yr and interest at 4 pct.

(16) *Question.* Is the dealer limited to the amount of equipment that he may sell?

Answer. No.

(17) *Question.* May the dealer sell equipment to export agents on the same basis as he can to a domestic buyer?

Answer. Yes, if the equipment is not needed for our own reconversion program.

(18) *Question.* Will a discount be allowed a dealer on new equipment on the 12½ pct basis?

Answer. Yes.

(19) *Question.* Will all Spot Sales be free from priorities on the first day of the sale, permitting the dealer to buy at the gross price?

Answer. Yes, since equipment put up on a spot sale basis has been screened for priorities before the sale begins. The idea of the spot sale is to liquidate equipment as quickly as possible, so that it will not require warehousing service.

(20) *Question.* How long will it

require RFC to place price tags and descriptions on the equipment?

Answer. The time will vary in different regional agencies depending on the quantity of equipment in inventory and the availability of personnel to do the job.

(21) *Question.* Can dealers buy machinery as principal without obtaining the resale discount and sell these tools over and above the Clayton Formula, but still within the ceiling price as placed on them by the Office of Price Administration?

Answer. If a dealer elects to buy as principal, he will not receive the commission of 12½ pct from RFC. His resale of machinery will not be subject to RFC control or regulations.

Navy Describes New Jet-Powered Bombs

Philadelphia

• • • **The Navy** has revealed that three new weapons were developed and manufactured at the naval aircraft modification unit, Johnsville, Pa., to rival Germany's buzz-bombs and Japan's kamikaze planes.

The weapons, known as gorgon, gargoyle and glomb, were pilotless aircraft capable of speeds of more than 500 miles an hour under radio control. They were built and tested in the past two years.

The gorgon, designed to carry 100 lb of explosives in its nose, is a jet-propelled missile which can be directed to its target by radio control, or by its own automatic target-seeking device after release from a mother plane.

The gargoyle, also jet-propelled, carries a 1,000 lb armor-piercing bomb, controlled visually by radio when released from the fuselage of a fighter plane. It can attain a top speed of 700 miles an hour in a dive on the target.

The glomb, or glider bomb, can carry 4,000 lb of explosives. It is towed by a lighter plane or patrol bomber and automatically released from the tow-plane by radio-control. The bomb has a television transmitter in its nose which permits the flier to guide it to a target when the pilot is not on the line of sight.

Canada's Munitions Output Will Drop In First Quarter

Ottawa

• • • **Production of military** supplies in Canada has dropped to the lowest point since such production commenced early in the war, the Department of Munitions and Supply announced in its last review. On the eve of its dissolution, the Department revealed that the rate of war production, based on an average for the last three months of 1945, was about $15,000,000 per month as compared with the all time peak of more than $150,000,000 a month in the last quarter of 1943. For the first quarter of this year the monthly average will not exceed $10,000,000, and the bulk of this expenditure will go to providing commissary supplies for the three armed forces, both in Canada and abroad.

Although most items of war equipment no longer are being made in Canada, production of some items, chiefly for Allied governments, will continue well into this year. The war production programs so far cancelled comprise military aircraft, armored vehicles, field and naval guns, machine guns, gun ammunition, chemicals and explosives. Still under production are some ships, railway equipment, military trucks, small arms, signals equipment and clothing. In addition a number of tanks and armored vehicles are being redesigned to conform with the latest advances in design. Certain types of railway equipment valued at $2,000,000, will be manufactured this year for export to Russia.

Since the outbreak of war, the Department of Munitions and Supply, made commitments totaling about $10 billion of which about $1,578,000,000 represent the total of war contracts awarded in 1945. The 1945 total shows a drop of 46 pct from the 1944 total, while the average quarterly production for the last year was about 53 pct below the peak last quarter of 1943.

The war years witnessed a greatly accelerated production and consumption of steel in Canada. In 1939 a total of 1,230,120 tons of steel were produced and in 1944

this had risen to 2,821,097 tons and in 1945 to approximately 2,860,000 tons. Consumption, likewise, moved up sharply. In 1939 Canada used 1,563,391 tons; in 1942, the peak consumption year for steel, 4,297,974 tons were used; by 1944 this consumption had fallen off to 3,442,805 tons and in 1945 totaled approximately 3,599,000 tons. The difference between production and consumption figures of steel is accounted for by imports, almost entirely from the United States.

From the beginning of the war to the end of 1945, Canadian shipyards produced 349 cargo ships in the 10,000 ton class; 43 cargo ships of smaller tonnage; two destroyers, 541 other naval craft; 1663 cargo lighters; 1331 mines barges, and nearly 4000 smaller craft, not powered. Automotive plants in Canada turned out almost 800,000 units of mechanical transport, and also ran up a total in armored fighting vehicles of 50,000 units. In military aircraft, more than 16,000 planes were turned out. Also produced in Canada were more than 1,600,000 machine guns, rifles, and other small arms; over 50,000 complete artillery units, and about $591,000,000 worth of radar, signals apparatus, electrical devices and instruments.

Doubles Output Of Cast Iron Soil Pipe

Washington

• • • **CPA has estimated** January production of cast iron soil pipe at about 26,500 net tons, more than double the June 1945 output of 12,638, and said that an encouraging increase in employment is reported by the industry, which indicates a continued rise in production may be anticipated unless deliveries of materials are interrupted because of work stoppages.

The rise in employment in southern plants was said to have been particularly marked since December and was attributed to the OPA price increase of $6 a ton and to WLB's wage increase of 10¢ an hr.

It was stated that 41 of the 52 cast iron soil pipe foundries are now operating, with three preparing to resume operations before March. Another plant which has been producing only soil pipe fittings, the statement said, expects to

complete a new foundry and begin production by spring, while a new producer was said to be planning to enter the soil pipe field about that time.

CPA announced that it has approved 45 applications from 10 foundries for priorities assistance to obtain equipment not immediately available on the market. Equipment valued at $281,797 was said to have been obtained with CPA assistance.

Cast iron soil pipe is one of the critical materials to which the new veterans' preference housing regulation (PR 33) will apply. A direction to the regulation is now being formulated by which a proportion of production of this material will be directed into veterans' housing.

Canadian Pig Iron Output in November Made 4-yr Low Record

Toronto

• • • **Production** of pig iron in Canada made a four-year low record in November when output dropped to 134,651 net tons, or 58.3 pct of total rated capacity. For the month immediately preceding production amounted to 140,693 tons or 60.9 pct and for November 1944, 146,972 tons. Output for November last included 101,075 tons of basic iron of which 94,745 tons were for further use of producing firms and 6300 tons for sale; 23,231 tons of foundry iron, all for sale and 10,345 tons of malleable iron, all for sale.

For the 11 months ending with November pig iron output totaled 1,642,733 net tons, which was 4.1 pct under the 1,713,467 tons reported for the same period of 1944 and compares with the 1943 output of 1,621,009 tons.

Charges to blast furnaces during November included 228,472 tons of iron ore, 31,896 tons of mill cinder, scale, sinter, etc., and 4765 tons of scrap iron and steel. For the 11 months, blast furnace charges included 2,913,055 tons of iron ore, 244,793 tons of mill cinder, scale, sinter, etc., and 70,404 tons of scrap iron and steel. At the end of November 8 blast furnaces were blowing and 6 blown out of a total of 14 in Canada with total rated capacity of 2,770,760 net tons.

Production of ferroalloys in November amounted to 13,360 net

tons, compared with 14,555 tons for October and 13,280 tons for November 1944. Output for the month included ferrosilicon, silico-manganese, ferromanganese, ferrochrome, chrome-x and ferrophosphorus.

For the 11 months ending with November cumulative production of ferroalloys totaled 171,522 net tons compared with 170,037 tons in the same period of 1944 and 201,649 tons in 1943.

Following are monthly production totals for pig iron and ferroalloys in net tons:

	Pig Iron	Ferro-alloys
January	155,969	12,130
February	149,487	13,402
March	165,817	16,434
April	156,070	18,350
May	155,574	19,883
June	159,046	18,473
July	150,387	15,750
August	139,812	15,668
September	135,227	13,517
October	140,693	14,555
November	134,651	13,360
Total	1,642,733	171,522

Steel Founders' Group Elects New Officers

Cleveland

• • • **Steel Founders'** Society of America has announced the election of E. D. Flintermann, Michigan Steel Casting Co., Detroit, as president of the society, succeeding A. M. Andorn, Penn Steel Castings Co., Chester, Pa. The new vice-president is Newlin T. Booth, Deemer Steel Casting Co., New Castle, Del.

Calbraith P. Champlin, Strong Steel Foundry Co., Buffalo, N. Y., was elected a member of the executive committee, to serve with Mr. Flintermann and Mr. Booth.

Board of directors for the new year are: E. D. Flintermann, chairman, Newlin T. Booth, C. P. Champlin, Raphael Ross, Dibert, Bancroft & Ross Co., Ltd., New Orleans, La., J. M. Lloyd, American Steel Foundries, Verona, Pa., A. A. Stroppel, The Sawbrook Steel Castings Co., Cincinnati, Ross L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., Arthur H. Moorhead, The Locomotive Finished Material Co., Atchison, Kan., and C. E. Buckner, Electric Steel Foundry Co., Portland, Ore.

Col. Merrill G. Baker was reappointed executive vice-president. Raymond L. Collier continues as executive secretary, and Charles W. Briggs is retained as technical and research director.